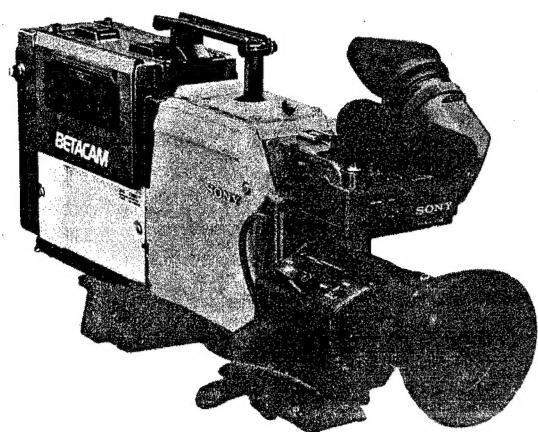


**SONY®**

PORTABLE VIDEOCASSETTE RECORDER

**BVV-1A**



***BETACAM***

OPERATION AND MAINTENANCE MANUAL

1st Edition (Revised 13)

Serial No. 10001 to 10490

Serial No. 40001 and Higher

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The operation of the Betacam system is described in the operation and maintenance manual of the camera. Please refer to it for details.



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## SECTION 1 OPERATION

The BVV-1A is a compact and lightweight portable video cassette recorder which, together with a Sony portable color video camera such as the BVP-1, BVP-3, BVP-3A, BVP-30, makes up the Betacam system for ENG (Electronic News Gathering). The easy-to-operate Betacam system makes one-man camera recording possible.

### 1-1. FEATURES

#### **Compact and lightweight**

The BVV-1A, BVP-1 camera, battery and cassette tape weigh only about 8 kg.

#### **High-quality picture**

A newly-developed recording system using 1/2-inch cassette tape has greatly improved the picture quality, which now approaches the quality of the 1-inch VTR picture.

#### **Video and audio confidence**

The video and audio confidence system makes it possible to check the recording picture and sound.

#### **Built-in time code generator**

A built-in time code generator allows simultaneous recording of the time code during operation. The user bit can also be recorded.

#### **Independent time code track**

The time code track is independent of the video track so that time code recording or erasing is possible using an editing control unit.

#### **Composite shooting**

Videocassette programs can be composed shot-by-shot without any glitches between scenes because vertical-interval timing with a tape back-up feature guarantees a clean cut every time.

#### **Rewind function**

A BCT-20K videocassette tape can rewind within 150 seconds.

#### **Speaker for monitoring audio**

A built-in speaker allows you to monitor the sound being recorded without connecting an earphone. The volume is adjustable.

#### **Warning lamps**

The RF, SERVO, HUMID, SLACK, TAPE END and BATTERY lamps allow you to monitor the operation. If there is a problem, an alarm is sounded simultaneously from the speaker and earphone.

#### **Dolby NR\* (Noise Reduction) C-type system for improving sound quality**

The newly developed C-type Dolby NR system is employed for an improved S/N ratio and wider dynamic range. To activate the Dolby NR circuit, refer to section 2.

#### **Audio level adjustment on the camera**

When the BVV-1A is used together with the BVP-3A or the BVP-30 in a Betacam system, the recording level of the audio channel 1 can be adjusted and monitored on the camera.

#### **Time code slave-lock**

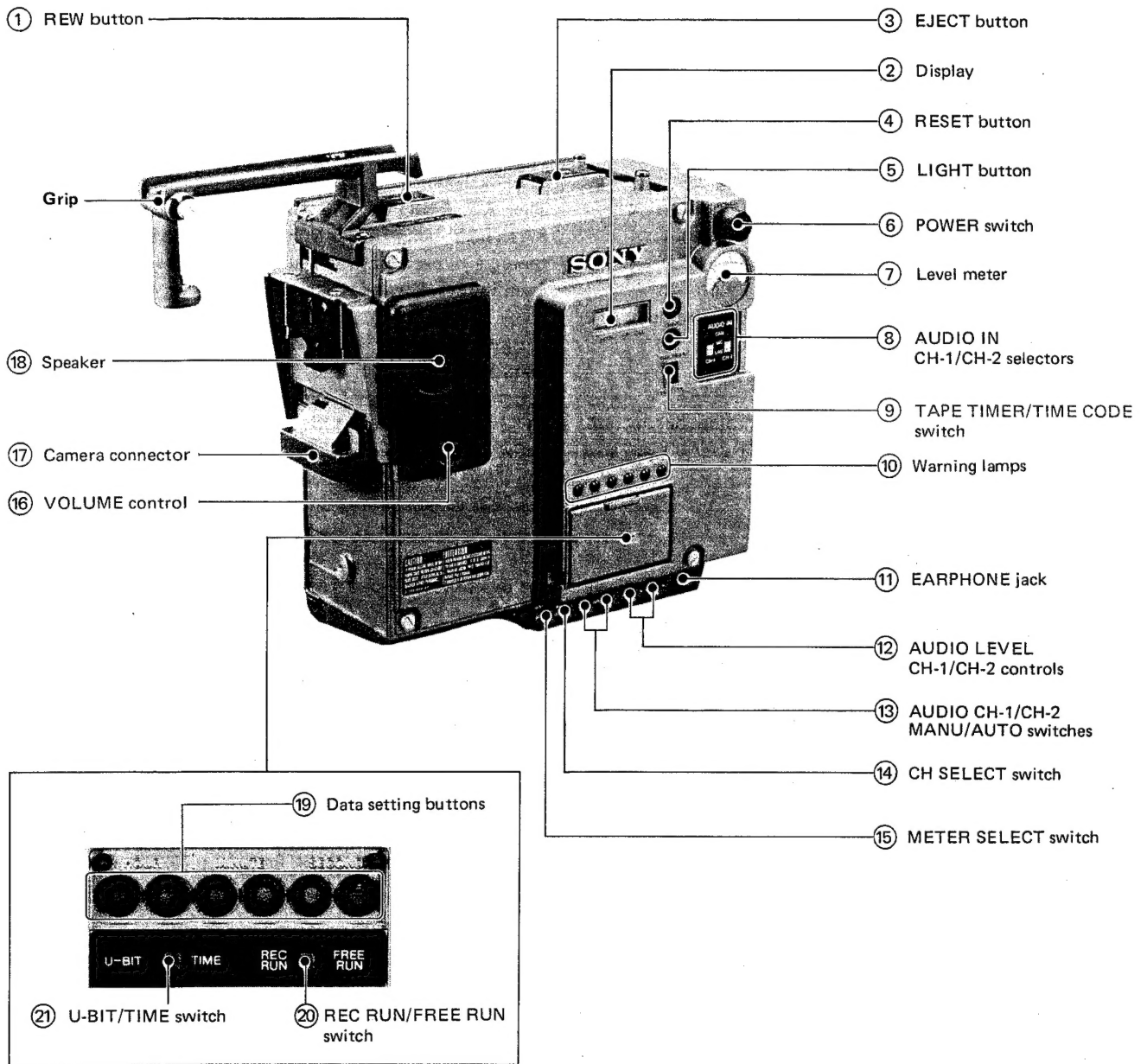
When the BVV-1A is used together with the BVP-3A or the BVP-30 in a Betacam system, the built-in time code generator can be locked to the external time code generator.

\* "Dolby" and the double-D symbol are trade marks of the Dolby Laboratories Licensing Corporation. Noise reduction system manufactured under license from Dolby Laboratories Licensing Corporation.



## 1-2. LOCATION AND FUNCTION OF PARTS

### 1-2-1. Operation Panel





### ① REW (rewind) button

Slide in the direction of the arrow with the CAMERA/VTR switch on the camera set to SAVE and the tape will rewind as long as the button is held. When the CAMERA/VTR switch is set to STBY, the tape cannot be rewound.

- When the VTR is in the record mode, the REW button does not function.
- When the tape is fully rewound, the motor will stop even if the REW button is pushed in.

### ② Display section

This indicates the tape run time, the time code or the user bit, depending on the setting of the TAPE TIMER/TIME CODE switch ⑨ and the U-BIT/TIME switch ⑳.

#### TAPE TIMER mode



#### TIME CODE mode



### ③ EJECT button

Slide in the direction of the arrow and the cassette compartment will open.

### ④ RESET button

To reset the counter to "00 00 00", press this button after setting the display in the TAPE TIMER mode.

### ⑤ LIGHT button

The display is illuminated as long as this button is pressed.

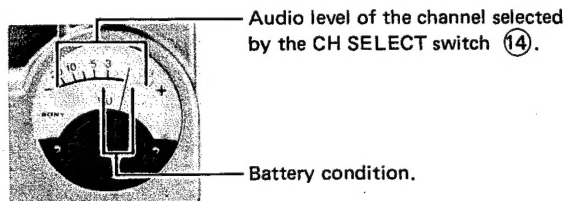
### ⑥ POWER switch

This is the main power switch. Set to ON, and the power to the VTR and the camera will be turned on and off depending on the position of the CAMERA/VTR switch on the camera. For details, refer to the instruction manual furnished with the camera.

To turn the power off, set the switch to OFF.

### ⑦ Level meter

This indicates the audio level or battery condition depending on the position of the METER SELECT switch ⑮.



### ⑧ AUDIO IN CH-1/CH-2 selectors

Select the sound source to be recorded on audio channel 1 or channel 2.

**CAM:** The sound from the built-in microphone.

**MIC:** The sound from the microphone connected to the AUDIO IN connectors.

**LINE:** The audio line source connected to the AUDIO IN connectors.

### ⑨ TAPE TIMER/TIME CODE switch

Selects the indication on the display.

**TAPE TIMER:** Tape run time.

**TIME CODE:** The time code generated by the built-in time code generator or the user bit.

### ⑩ Warning lamps

#### RF lamp

Blinks to indicate that the video head is clogged or that the recording cannot be made because of trouble in the recording circuit.

#### SERVO lamp

Blinks to indicate that the drum servo is not locked.

- The lamp may momentarily blink when the tape starts running but this is not a problem.

#### HUMID lamp

Lights to indicate that the moisture has condensed on the head drum.

#### SLACK lamp

Blinks to indicate that the tape is slack between the capstan and the take-up reel. The tape automatically stops to prevent the tape from becoming entangled in the transport system.

#### TAPE END lamp

Blinks when the tape ends.

#### BATTERY lamp

Blinks when the voltage of the NP-1 battery pack falls below 11.45 V, and lights when the voltage falls to 11.0 V. The tape automatically stops.

### ⑪ EARPHONE jack (mini jack)

Connect an 8-ohm earphone. During recording, simultaneous playback sound (mixed sound of channel 1 and 2) can be monitored. In the other modes, the E-to-E sound selected by the AUDIO IN selectors ⑧ and the CH SELECT switch ⑭ can be heard.

The warning sound corresponding to the warning lamps is also heard. When an earphone is connected, the sound from the speaker is cut off.

### ⑫ AUDIO LEVEL CH-1/CH-2 controls

These adjust the audio recording level when the AUDIO MANU/AUTO switch ⑬ is set to MANU. The CH-1 control adjusts audio channel 1 and the CH-2 control adjusts audio channel 2.

### ⑬ AUDIO CH-1/CH-2 MANU/AUTO switches

**MANU:** To adjust the audio recording level manually.

**AUTO:** To adjust the audio recording level automatically.

### ⑭ CH SELECT switch

Selects the audio channel to be displayed on the level meter or the channel to be heard from the speaker or the earphone.

**CH-1:** Audio channel 1.

**MIX:** Mixed sound of audio channels 1 and 2.

**CH-2:** Audio channel 2

During recording, the meter displays the E-to-E sound level and the simultaneous playback sound can be heard from the speaker or the earphone.

### ⑮ METER SELECT switch

Selects the display for the level meter.

**AUDIO:** The sound level of the channel selected by the CH SELECT switch ⑭ is displayed.

**BATT:** The approximate voltage of the NP-1 battery pack installed or the power source connected to the DC IN 12 V connector is displayed.

### ⑯ VOLUME control

This adjusts the sound level from the speaker or earphone. Turning the control to MAX increases the sound volume. At the MIN position, no sound can be heard.



### ⑰ Camera connector (50 pin)

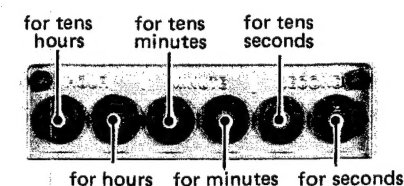
Connect to the 50-pin connector on the camera or other equipment.

### ⑱ Speaker

During recording, simultaneous playback sound (mixed sound of the audio channels 1 and 2) can be monitored. In other mode, the E-to-E sound selected by the AUDIO IN selectors ⑧ and the CH SELECT switch ⑭ can be heard. The sound corresponding to the warning lamps is also heard. When an earphone is connected to the EARPHONE jack ⑪, the sound from the speaker is cut off.

### ⑲ Data setting buttons

Press to set the time code or the user bit.



### ⑳ REC RUN/FREE RUN switch

**REC RUN:** The time code is generated only in the record mode. A continuous time code can be recorded throughout the tape. To set the time code or the user bit, be sure to use this position.

**FREE RUN:** The time code is always generated independent of the mode of the VTR. To record the actual time as the time code data, or to lock the built-in time code generator to an external time code generator, for example, use this position.

- When the VTR is in the FREE RUN mode, do not set this switch to REC RUN position, or the correct time code will not be obtained.

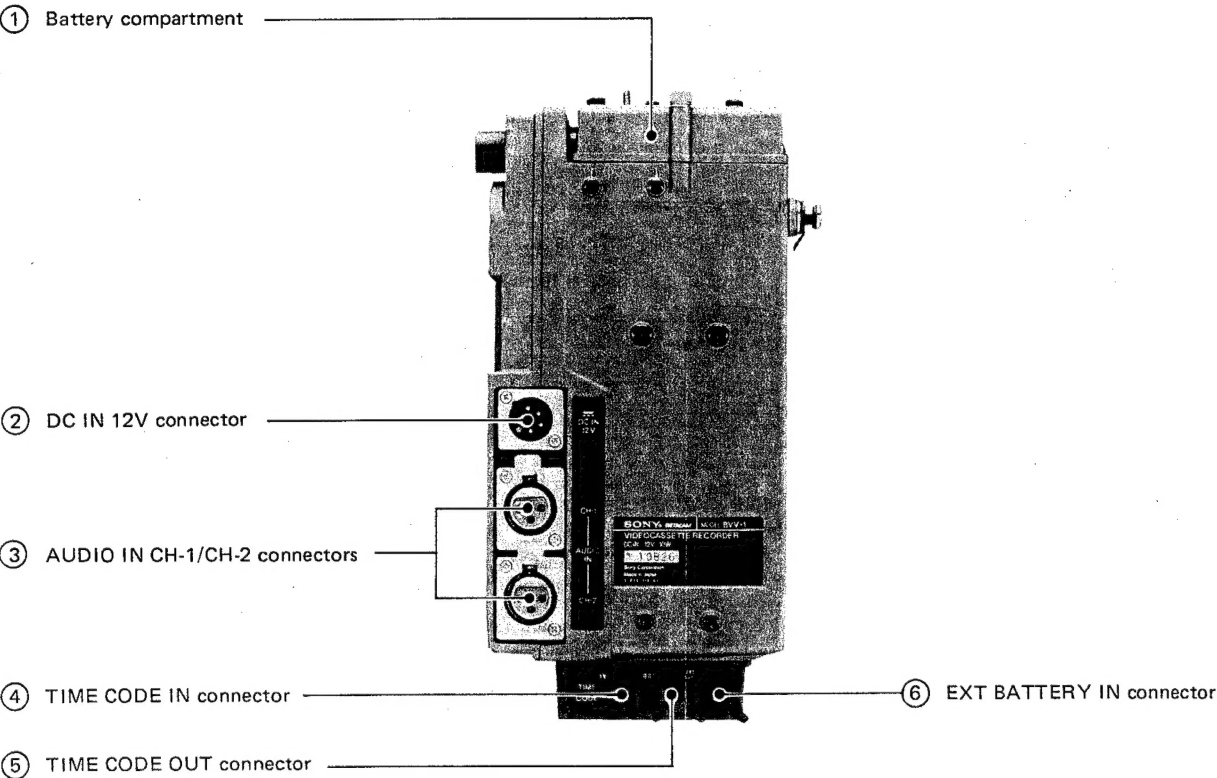
### ㉑ U-BIT/TIME switch

**U-BIT:** To set the user bit or to display the user bit.

**TIME:** To set the time code or to display the time code.

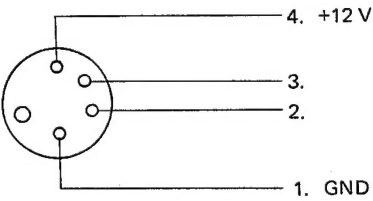
- When the user bit is being set, the time code is not generated because the REC RUN/FREE RUN switch is set to REC RUN. So the user bit should be set before setting the time code.

1-2-2. Connector Panel



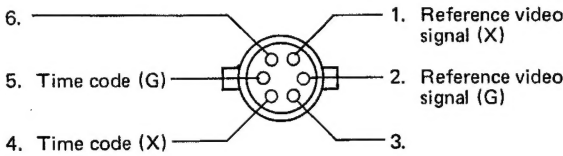
① **Battery compartment**  
Insert an NP-1 battery pack.

② **DC IN 12 V connector (XLR 4 pin)**  
To operate the unit on ac power, connect the dc power cord of an AC-500 ac adaptor.

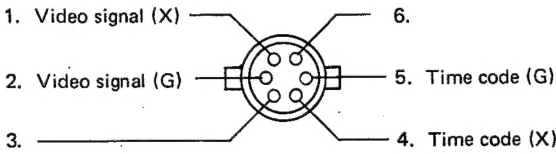


③ **AUDIO IN CH-1/CH-2 connectors (XLR 3 pin)**  
Connect external microphones or other audio equipment.

④ **TIME CODE IN connector (6 pin, male)**  
Inputs the time code from an external time code generator to which the built-in time code generator is locked. Connect to the time code output connector on an external time code generator using the supplied time code cable.



⑤ **TIME CODE OUT connector (6 pin, female)**  
Outputs the time code to which a time code generator of the other VTR is locked. Connect to the time code input connector on the other VTR.

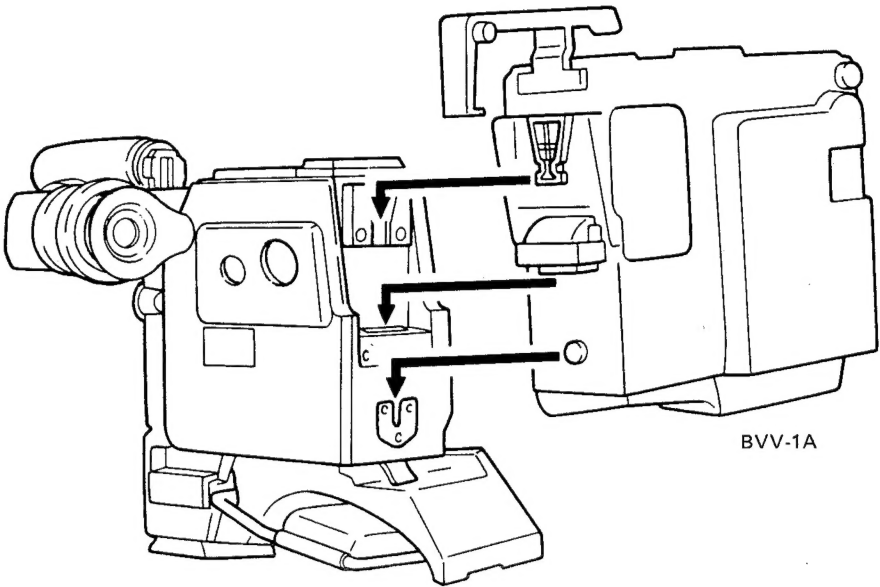


⑥ **EXT BATTERY IN connector**  
Connect the dc power cord of a DC-100 battery adaptor (optional).

1-3. SET UP

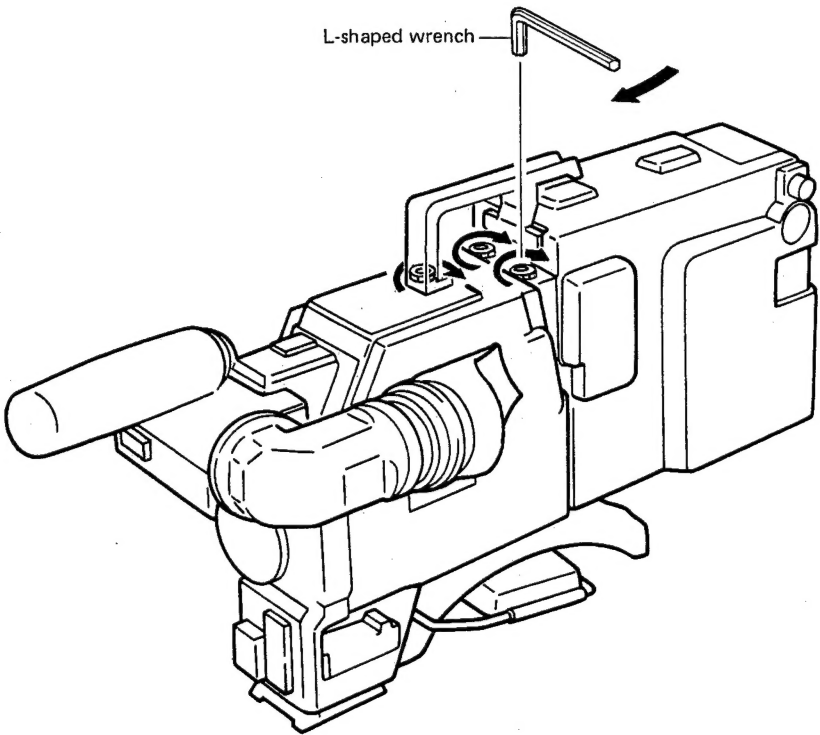
1-3-1. How to Assemble the VTR and the Camera

1.



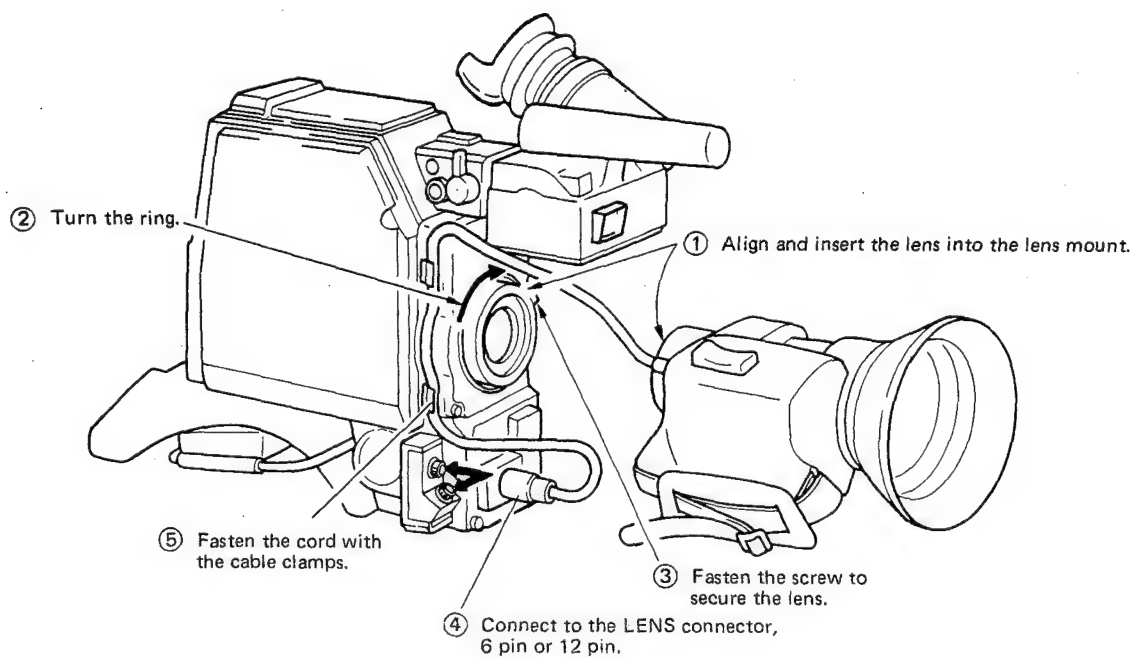
BVP-1, BVP-3, BVP-3A, BVP-30, etc.

2.





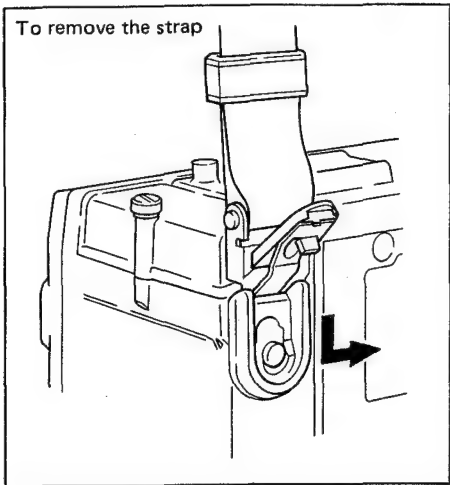
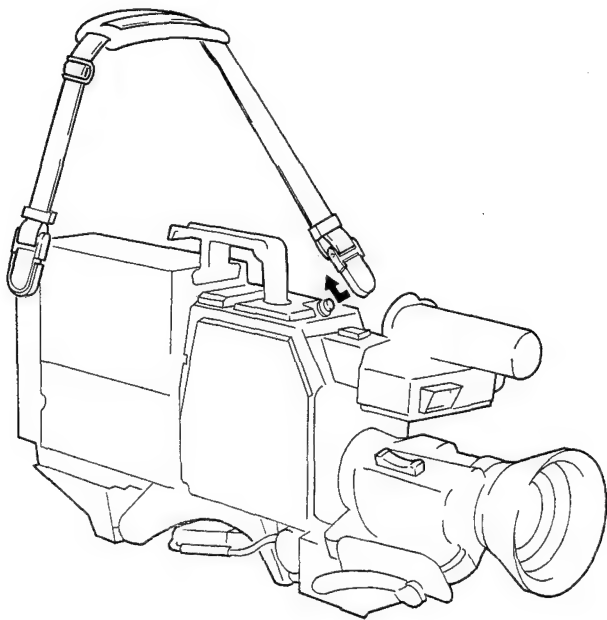
3. Attach the lens to the camera.



- For details on the lens, refer to the operation manual furnished with the lens.



1-3-2. How to Attach the Shoulder Strap



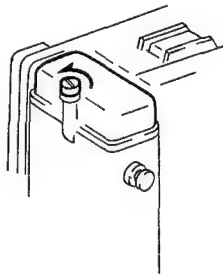
## 1-4. POWER SOURCES

Operate this set with an NP-1 rechargeable battery pack or with an AC-500 ac power adaptor.

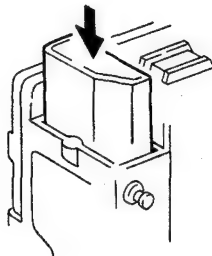
### 1-4-1. Battery Installation

A fully-charged battery provides approximately 50 minutes of continuous operation when the BVP-1 video camera is used together. Install an NP-1 battery pack as follows.

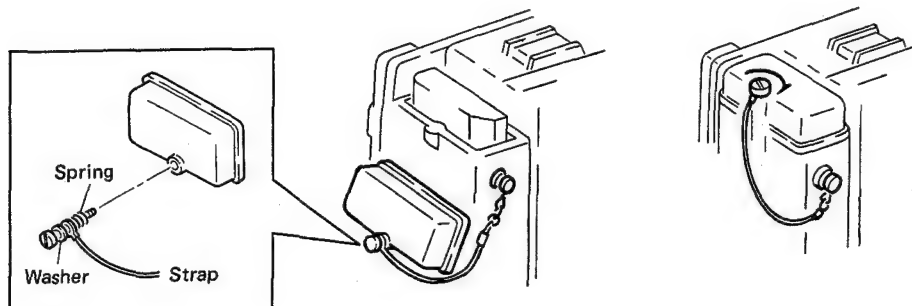
1. Loosen the screw of the battery compartment and remove the lid.



2. Insert a battery pack as illustrated.



3. Attach the lid strap (supplied), replace the lid and tighten the screw.

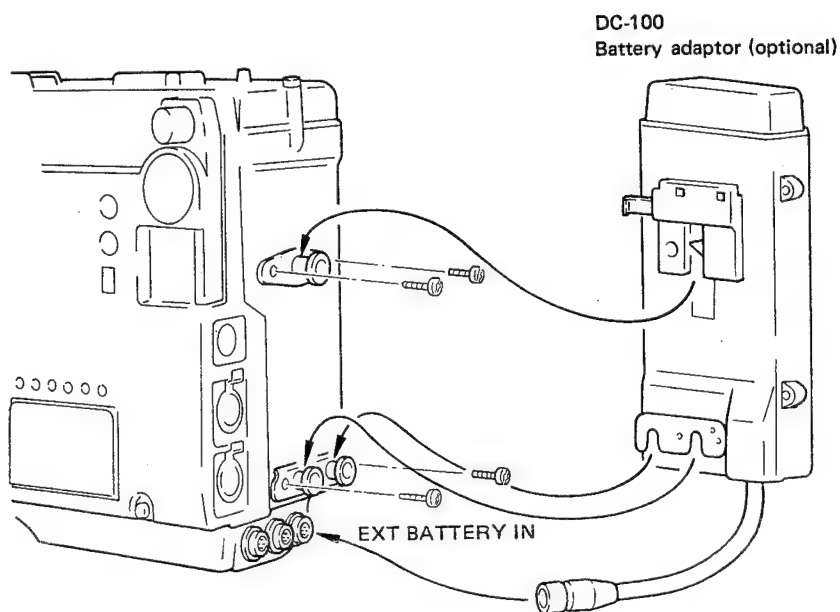


#### Notes on battery

- Be sure to recharge the battery pack before every use. The charging time is about 1 hour at normal temperature.
- When the NP-1 battery pack is installed, the power is always supplied to the time code circuit even if the POWER switch is set to OFF. Remove the battery pack from the battery compartment when the set will not be used for a long period of time.
- The battery pack may not charge if you try to recharge it immediately after it has been used. If this happens, wait for a few minutes before recharging it.

### 1-4-2. Extra Battery

An extra battery installed in a DC-100 battery adaptor (optional) can be used to provide longer operation.

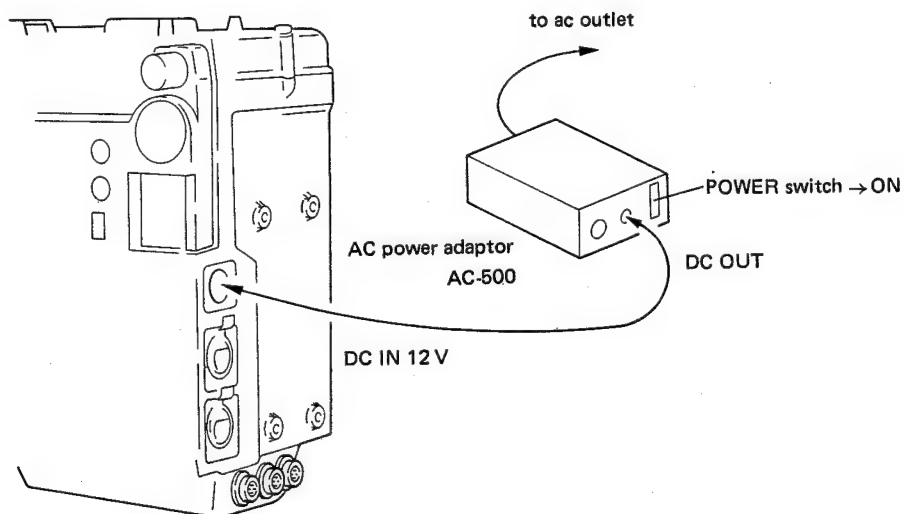


### 1-4-3. Charging the Battery Pack

Before operating the set, always charge the battery pack using the BC-1WA battery charger. For details on charging, please read the instruction manual of the BC-1WA.

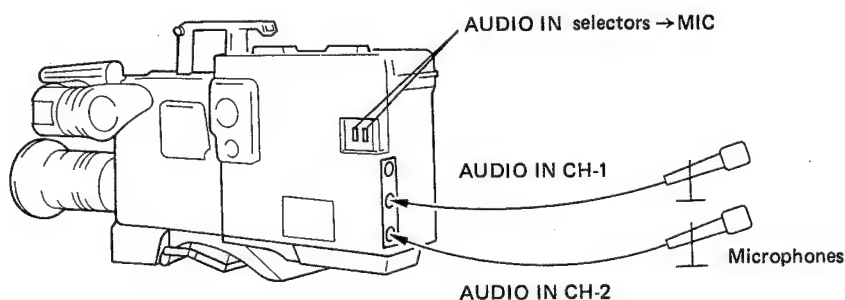
### 1-4-4. On AC Power

Connect the AC-500 ac power adaptor as illustrated.



## 1-5. CONNECTIONS

### 1-5-1. Audio Recording from External Microphones



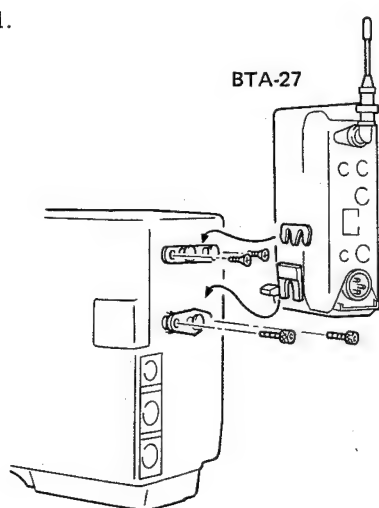
### 1-5-2. Audio Recording Using a Wireless Microphone

Audio recording can also be made using the Sony wireless microphone system: WRR-27 UHF portable tuner, WRT-27 transmitter, WRT-57 wireless microphone, etc.

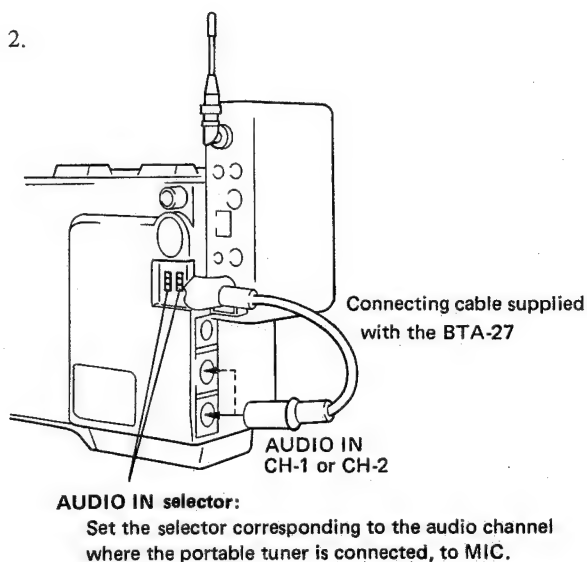
Attach the WRR-27 portable tuner in its case (optional), as illustrated. The WRR-27 can also be attached at the rear of the DC-100 battery adaptor, in the same way as well.

- For details on the wireless microphone system, see the instruction manual furnished with each unit.

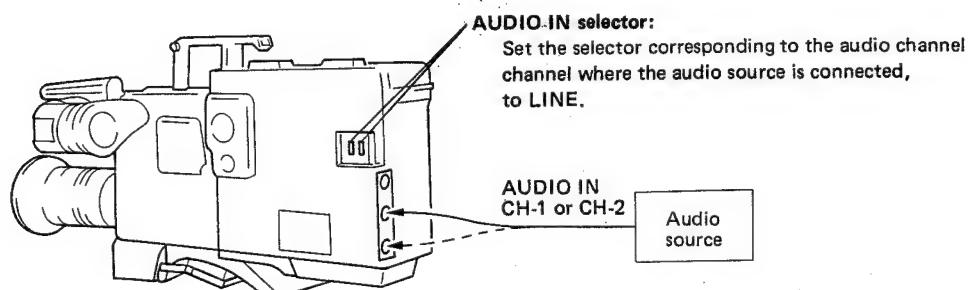
1.



2.



### 1-5-3. Audio Recording from Another Equipment



## 1-6. OPERATION CHECK AND ADJUSTMENT

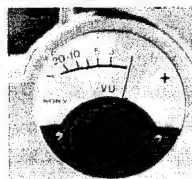
### 1-6-1. Preparation

1. Insert a fully-charged battery pack.

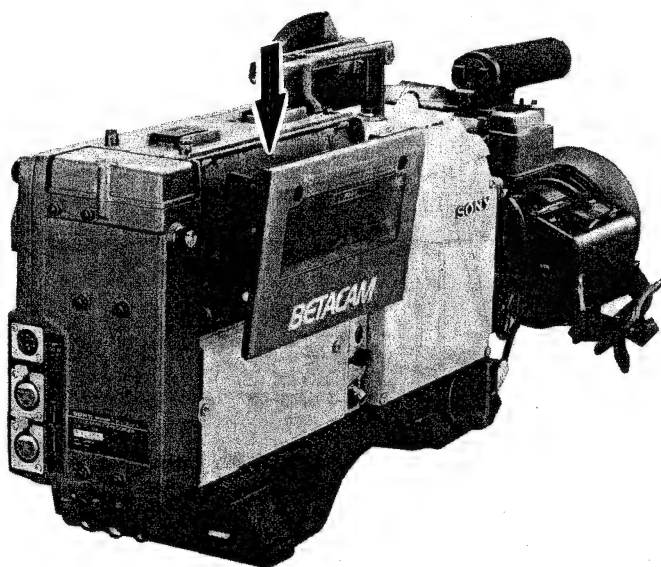
2. Set the POWER switch to ON

3. Check that the HUMID lamp does not light.

4. Check the battery.  
Set the METER SELECT switch to BATT and check that the meter pointer deflects into the green zone.



5. Insert a cassette tape.

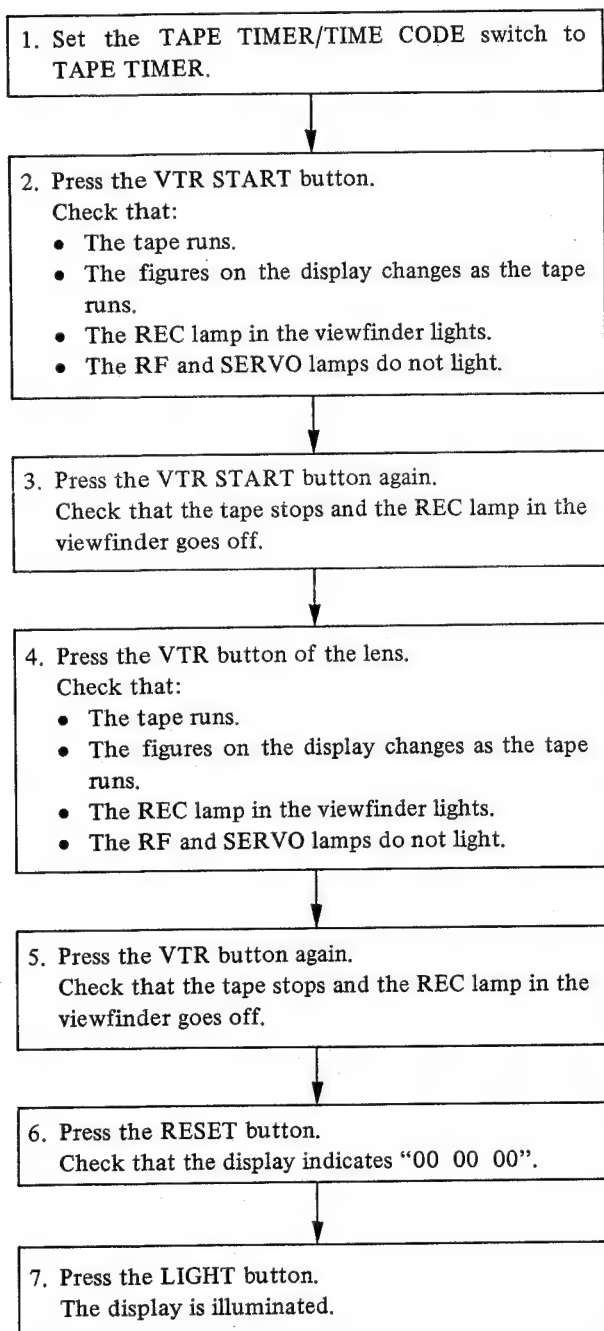


- Check that the safety tab at the bottom of the cassette is in place.

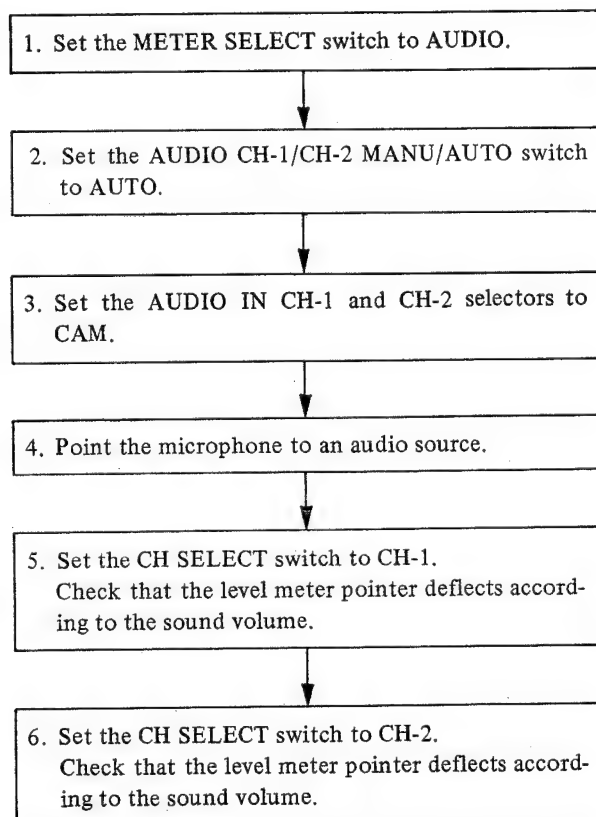
## 1-6-2. Check of the VTR

Proceed 1 through 5 continuously.

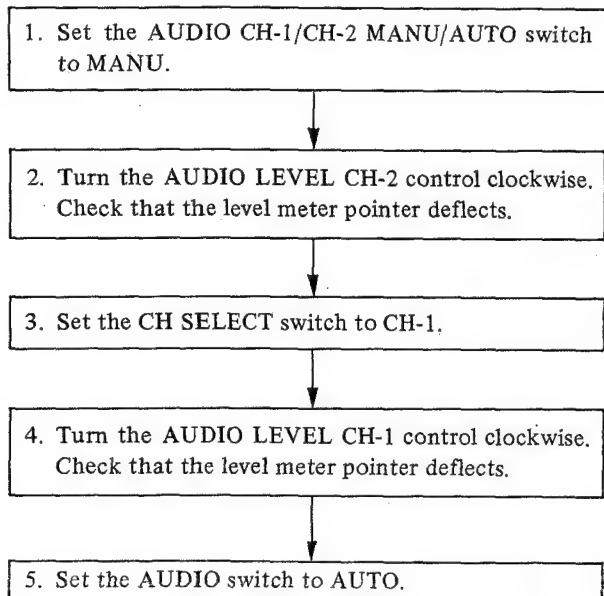
### 1. Check the tape transport



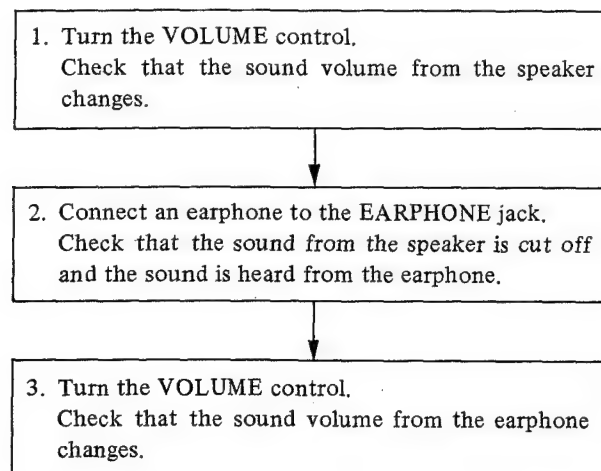
### 2. Check the automatic audio recording level adjustment.



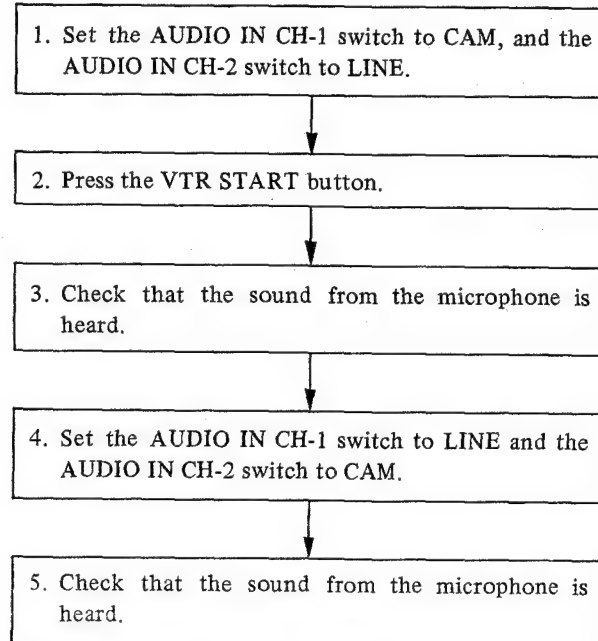
### 3. Check the manual audio recording level adjustment



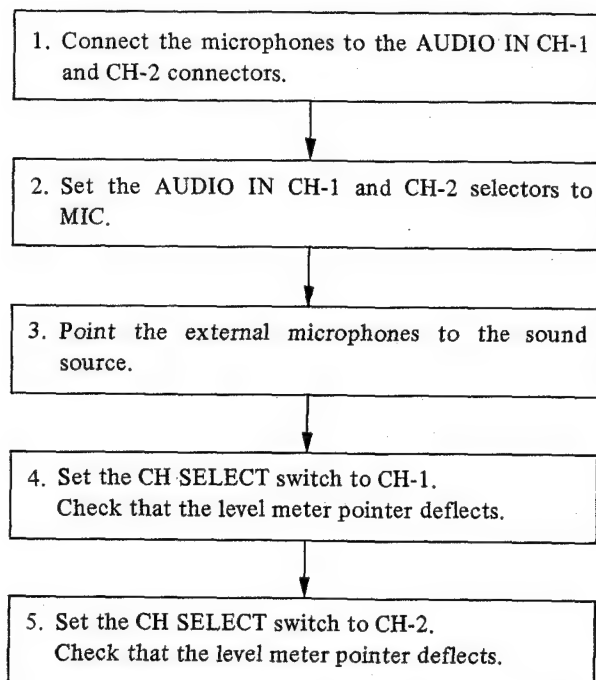
### 4. Check the earphone and speaker



### 5. Check the audio confidence function



### 6. Check the external microphones





### 1-6-3. Audio Recording Level Adjustment

The audio recording level is automatically adjusted when the AUDIO CH-1/CH-2 MANU/AUTO switch is set to AUTO. You can also adjust the recording level manually, as follows. When the BVP-3A or BVP-30 video camera is used, the level of the audio channel 1 can be adjusted on the camera.

**When a video camera BVP-3A or BVP-30 is used**

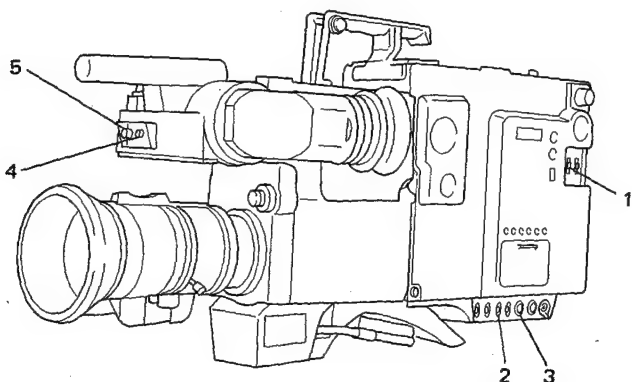
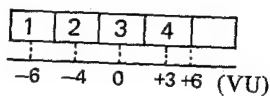
**To adjust the audio channel 1, proceed as follows:**

1. Set the AUDIO IN CH-1 selector as follows:  
CAM: when using the built-in microphone  
MIC: when using an external microphone  
LINE: when using another audio equipment
2. Set the AUDIO CH-1 AUTO/MANU switch to MANU.
3. Turn the AUDIO LEVEL CH-1 control on the VTR fully clockwise.
4. Set the AUDIO/FILTER switch on the camera to AUDIO.
5. Turn the AUDIO CH-1 control on the camera so that the 1 through 4 lamps of the FILTER/AUDIO indicator is usually lit and the red indicator is momentarily lit at the maximum input.
  - The maximum attenuation of the AUDIO CH-1 control on the camera is approximately 20 dB. If an appropriate level cannot be obtained within this range, adjust the level by using the AUDIO LEVEL CH-1 control on the VTR.
  - The FILTER/AUDIO indicator in the viewfinder shows the level responding to the peak signal. When a sine wave is input and the level meter pointer deflects to 0 VU, the indicator is designed to indicate 3. When audio signals are input and the level meter pointer deflects to around 0 VU, the indicator indicates 4.

The viewfinder indication corresponds to that of the level meter as follows:

FILTER/AUDIO indicator

Level meter indication  
of sine wave



**To adjust the audio channel 2, proceed as follows:**

1. Set the AUDIO IN CH-2 selector as follows:  
CAM: when using the built-in microphone  
MIC: when using an external microphone  
LINE: when using another audio equipment
2. Set the AUDIO CH-2 MANU/AUTO switch to MANU.
3. Set the METER SELECT switch to AUDIO.
4. Set the CH SELECT switch to CH-2.
5. Turn the AUDIO LEVEL CH-2 control so that the meter pointer swings up to 0 VU at their maximum deflection.

**When a video camera BVP-1 is used**

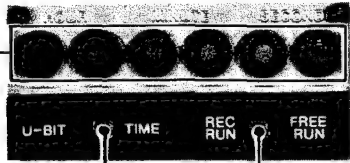
The level of audio channel 1 and 2 cannot be adjusted on the camera. Adjust the level with the AUDIO LEVEL CH-1 and CH-2 controls on the VTR.

#### 1-6-4. Alarm Sound Level Adjustment

The alarm volume from the speaker or the earphone can be adjusted with the VOLUME control. You can also modify only the alarm sound volume. For details, see the appropriate section.

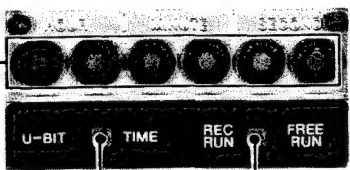
#### 1-6-5. Setting the Time Code and User Bit

##### Time code

3. Set the time code.
- 
1. U-BIT/TIME switch → TIME      2. REC RUN/FREE RUN switch → REC RUN
4. If necessary, set the REC RUN/FREE RUN switch to FREE RUN.

- The maximum time code is 23:59:59. If the figure more than 23 is entered as the data of the hour, the displayed time code cannot keep the correct value.

##### User bit

3. Set the user bit figure
- 
1. U-BIT/TIME switch → U-BIT      2. REC RUN/FREE RUN switch → REC RUN

The data of the user bit is displayed in the hexadecimal notation. The figure A to F is indicated as follows in this model.

	A	B	C	D	E	F
Display	L	H	F	R	-	Not displayed

- If you use both the time code and the user bit, set the user bit first. If you reverse this procedure, the time code will lose time as the time code generator stops while the user bit is being set.

##### Check the time code and user bit

1. Set the REC RUN/FREE RUN selector to REC RUN.
2. Set the user's bit.
3. Set the time code.
4. Press the VTR START button.  
Check that the number of the display changes as the tape runs.
5. Press the VTR START button again.  
Check that the tape stops and that the number of the display also stops.
6. Set the REC RUN/FREE RUN selector to FREE RUN.  
Check that the number of the display changes.
7. Reset the time code correctly, if necessary.

##### Keeping the time code during battery replacement

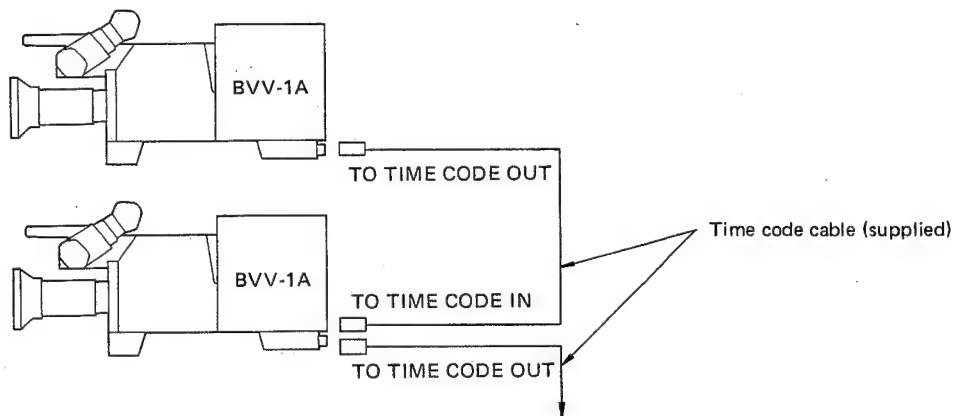
The back up battery hold the time code for about 1 minute while the battery is replaced.

#### 1-6-6. Time Code Slave-lock

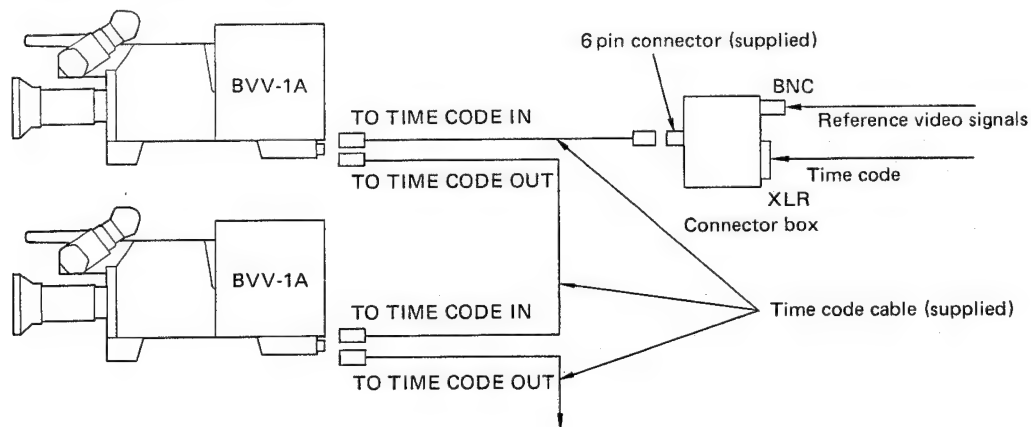
When the BVV-1A is used together with video cameras, such as BVP-3A, BVP-30, or BVP-300, which can be locked to external sync signal, the built-in time code generator can be locked to an external time code generator.

## Connections

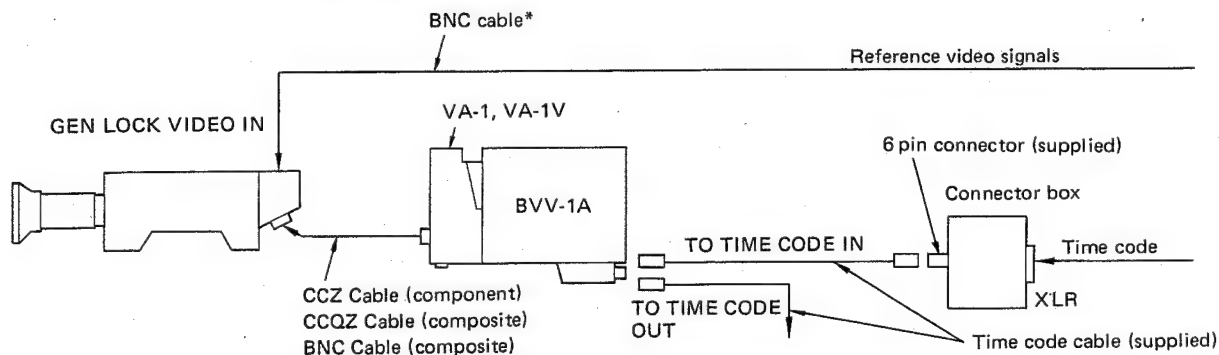
- To lock the time code generators of the BVV-1A VTRs to one master VTR (when used as a Betacam system)



- To lock the BVV-1A to an external time code generator (when used as a Betacam system)



- To use the BVV-1A and the video camera separately



\* When recording the composite video signals with the built-in time code generator locked to an external time code generator, be sure to connect the BNC cable to the video camera to maintain the color framing of the camera.

## Operation

1. Set the POWER switch of the BVV-1A to ON.
2. Set the CAMERA/VTR power switch on the camera to ON.
  - If the switch is set to SAVE, the time code is not locked to the external time code generator when the composite video signals are recorded using the VA-1V a VTR composite/component adaptor.
3. Set the REC RUN/FREE RUN switch on the BVV-1A to FREE RUN.
4. Set the TAPE TIMER/TIME CODE switch on the BVV-1A to TIME CODE.

When the reference time code and the video reference signals are supplied to the VTR, the time code will be locked. The time code cable connecting the VTR and the master time code generator can be removed about 10 seconds after the time code slave-lock is completed.

## Notes

- The phase relation between the reference time code and the reference video signal should satisfy the SMPTE time code standards.
- After the time code is locked, wait for a few seconds until the sync generator of the camera is stable before setting the VTR in the record mode.
- After the time code is locked, the time code cable can be detached from the VTR. In this case, the accuracy of the time code generated by the BVV-1A time code generator corresponds to that of the sync generator of the camera ( $\pm 0.3$  frame/hour on BVP-3A, BVP-30).
- In the slave-lock mode, keep the CAMERA/VTR switch on the camera to ON. If the switch is set to PREHEAT, or the POWER switch on the VTR is set to OFF, the built-in time code generator generates the time code, but the accuracy will be  $\pm 3$  frames/hour.
- In the slave-lock mode, the user bit is automatically locked to the user bit data of the external time code generator. Accordingly, the user bit cannot be set respectively on each VTR.
- The BVV-1A is designed so that the output signal of the built-in time code generator is locked to the video signals based on the field 1 information from the video camera. In the slave-lock mode, the field 1 information is cut off automatically as the built-in time code generator is locked to the external time code generator. To resupply the field 1 information to the VTR, first cut off the time code from the external time code generator, and then set the REC RUN/FREE RUN switch to REC RUN.
- When recording composite video signals using the VA-1V in the slave-lock mode, make sure that the CAMERA/VTR power switch on the camera is not set to SAVE. Otherwise the time code will not be generated continuously as the VA-1V will be in the power saving mode, and the composite sync signals to the built-in time code generator will be cut off in the SAVE mode.

## Time code slave-lock when changing the power source

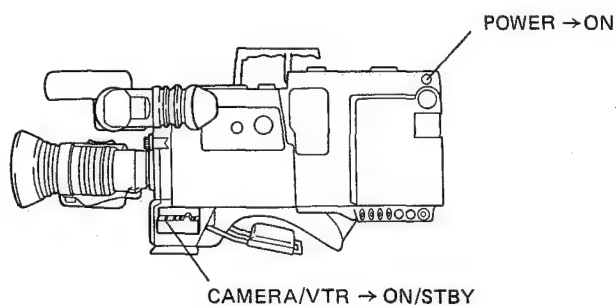
The BVV-1A is designed so that the power will be supplied continuously even when the power source is switched from power of the DC IN 12V connector to the NP-1 battery pack. Thus the slave-lock mode can be kept continuously to generate the time code correctly.

- When the unit is operated on external power, it also draws power from the NP-1. When the BVW-3A is operated with a BP-90 battery pack, for example, and the BATTERY lamp lights up, you can operate the unit for another 10 minutes after switching the power source to NP-1. After operating with an AC-500 for an hour, the unit can be operated with the NP-1 for another 20 minutes.

## 1-7. OPERATION

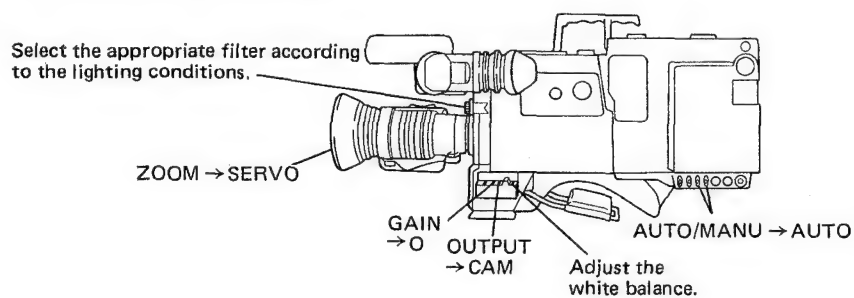
### 1-7-1. Recording

1. Turn the power on.



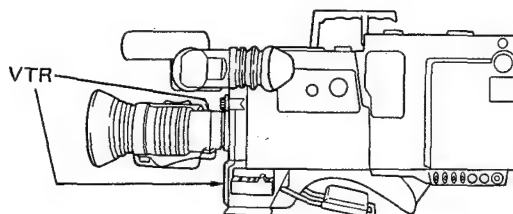
2. Insert a cassette tape.

3. Set the switches as follows.



4. Point the camera to the subject, and adjust the focus and zoom.

5. Press the VTR START button or the VTR button and the recording begins.



During recording, the REC lamp (red) in the viewfinder is lit.

6. To stop recording, press the VTR START button or the VTR button again. The VTR enters the pause mode and the REC lamp will go off.



## 1-7-2. Warning System

The indications and lamps in the viewfinder, the warning lamps on the VTR and the alarm from the speaker or the earphone serve to advise the operator of the following operational states.

Cause	Indications in the viewfinder			Warning lamps on VTR					
	REC	TAPE 5M	BATT	RF	SERVO	HUMID	SLACK	TAPE END	BATTERY
Tape nearly at its end									
End of tape									
Battery near end									
Battery end									
Something wrong in the recording system									
Irregularity in servo									
Moisture condensation									
Slack tape									

### Lamps

#### Lamps



: Blinks in 1 Hz



: Blinks in 4 Hz



: Lights up

#### Sound of alarm








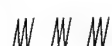


: In 1 kHz, 1 second interval



: In 1 kHz, 1/4 second interval



: Continuous sound

Alarm sound	VTR operation and correction
	Recording continues.
	Recording stops. Change cassettes.
	Recording continues.
	Recording stops. Change batteries.
	Recording continues. Recording may not be performed correctly. Head-cleaning is required.
	Recording continued. Recording may not be performed correctly. Turn off the power and consult your nearest Sony dealer. The lamp may momentarily blink when the tape starts running, but this is not a problem.
	Recording continues as long as the tape does not stick to the head drum. If this happens, recording will stop and the tape will be unloaded.
	Recording stops. The POWER switch and the EJECT button do not function. Remove the cassette manually referring to the appropriate section.

#### Notice on moisture condensation

Moisture may condense on the drum assembly if the set is moved directly from a cold to a warm location or if the set is used in a very humid place. This may cause resulting in damage to the tape to adhered the head drum. To avoid this, take care on the following precautions.

- When the set is moved directly from a cold to a warm location, be sure to remove the cassette.
- Before inserting a cassette, set the POWER switch to ON and check that the HUMID lamp does not light. If it lights, wait until the HUMID lamp goes off before inserting a cassette.

- If moisture has been condensed in the VTR with the cassette inserted proceed as follows:

#### If the POWER switch is set to OFF

Press the EJECT button and remove the cassette. Set the POWER switch to ON and wait until the HUMID lamp goes off.

#### If the POWER switch is set to ON and the VTR is in the record or standby mode

Press the EJECT button and remove the cassette. Wait until the HUMID lamp goes off.

## 1-8. DROP FRAME AND NON-DROP FRAME

The BVV-1A operates in the drop frame mode. To change the set to the non-drop frame mode, refer to the appropriate section.

## 1-9. CLEANING THE HEADS

Use the HG-5CL cleaning cassette to clean the heads. Carefully read the instruction manual furnished with the HG-5CL. Excessive or incorrect use of the cleaning cassette may shorten the head life.

## 1-10. NOTES ON OPERATION

Do not use the unit in extremely hot or cold locations or in places where the humidity is high. The unit is designed to operate in temperatures ranging from 0°C to 40°C (32°F to 104°F). Avoid sudden temperature changes, particularly from an extremely cold location to a warm one, as this is conducive to condensation of moisture on the head drum assembly.

- Do not subject the unit to unnecessary vibration when carrying it.
- Avoid dusty locations.
- If the unit is not used for an extended period of time, remove the battery pack.

## 1-11. SPECIFICATIONS

### Mechanical section

Weight	BVV-1A: 3.5 kg (7 lb 11 oz) NP-1 battery pack: 680 g (1 lb 8 oz) BCT-20K video cassette tape: 200 g (7 oz)
Dimensions	112 x 203 x 232 mm (w/h/d) (4 1/2 x 8 x 9 1/4 inches)
Video cassette	BCT-5K/10K/20K/30K cassette (1/2-inch cassette for Betacam) and equivalent
Tape speed	118.6 mm/sec
Wow and flutter	Less than 0.15% rms (with standard playback machine)
Continuous recording time	Approx. 50 minutes with fully charged NP-1 battery pack when the BVP-1 is used together
Recording time	20 minutes (with BCT-20K)
Connectors	Camera: 50 pin AUDIO IN CH-1/CH-2: XLR 3 pin, female EARPHONE: mini jack DC IN 12 V: XLR 4 pin TIME CODE IN: 6 pin, male TIME CODE OUT: 6 pin, female
Operating temperature	0°C to 40°C (32°F to 104°F)
Operating humidity	Less than 80% (relative humidity)
Storage temperature	-20°C to +60°C (-4°F to +140°F)

### Electrical section

#### Power requirements

DC 12 V  $\pm 4$  V  
-0.5 V  
Using the NP-1 battery pack (nickel-cadmium, 1.5 Ah)  
For ac operation: use AC-500 ac power adaptor (optional)

#### Power consumption

10 W (12 V, 830 mA)  
2.4 W in power save mode



## Video

### Recording system

Luminance: FM  
Chrominance: Compressed Time Division  
Multiplex FM

### Input

Luminance: 1.0 V(p-p), 1 k ohm, unbalanced  
Chrominance: R-Y 0.7 V(p-p), 1 k ohm unbalanced  
B-Y 0.7 V(p-p), 1 k ohm unbalanced

Sync: 5 V(p-p) (TTL level)

Bandwidth Luminance: 30 Hz - 4.1 MHz  $^{+0.5}_{-6.0}$  dB  
Chrominance: R-Y 30 Hz - 1.5 MHz  $^{+0.5}_{-3.0}$  dB  
B-Y 30 Hz - 1.5 MHz  $^{+0.5}_{-3.0}$  dB

### Signal-to-noise ratio

Luminance: More than 48 dB  
AM: More than 50 dB  
PM: More than 50 dB

### K factor (2T pulse)

Less than 3%

Y/C delay Less than 20 nsec

## Audio

### Input

MIC: -60 dB, 3 k ohms, balanced  
(for 600 ohm microphones)

Output LINE: +4 dB, 10 k ohms, balanced  
Speaker, EARPHONE (for 8 ohm earphone):  
-20 dB Max (variable)

### Frequency response

50 Hz to 15 kHz  $\pm 3$  dB (with standard playback machine)

Distortion Less than 2% (with 1 kHz reference level, standard playback machine)

### Signal-to-noise ratio

Better than 50 dB (3% distortion, with standard playback machine)

## Time code

### TIME CODE IN

Time code: 0.5 - 5 V(p-p), 10 k ohms  
unbalanced

Reference video signal: 1 V(p-p)  $\pm 3$  dB,  
75 ohms

### TIME CODE OUT

Time code: 3  $\pm$  0.5 V(p-p), 3 k ohms  
unbalanced (with 10 k ohms  
load)

Reference video signal: 1 V(p-p)  $\pm 1$  dB,  
75 ohms

## Supplied accessories

Shoulder strap x1  
Battery compartment lid strap x1  
L-shaped wrench x 1  
50 pin cap x 1  
Time code cable \* x 1  
6 pin connector\* x 1

\* The time code cable and the 6 pin connector are supplied with the BVW-3A, BVW-30 or BVV-1A (as accessories). They are not supplied with the BVW-1.

Design and specifications subject to change without notice.

### Recommended equipment

Color video camera BVP-1, BVP-3, BVP-3A, BVP-30

Battery pack NP-1

Battery charger BC-1WA

Ac power adaptor AC-500

Earphone ME-20B

Battery adaptor DC-100

Wireless microphone WRT-57

UHF portable tuner WRR-27

UHF transmitter WRT-27

WRR adaptor BTA-27

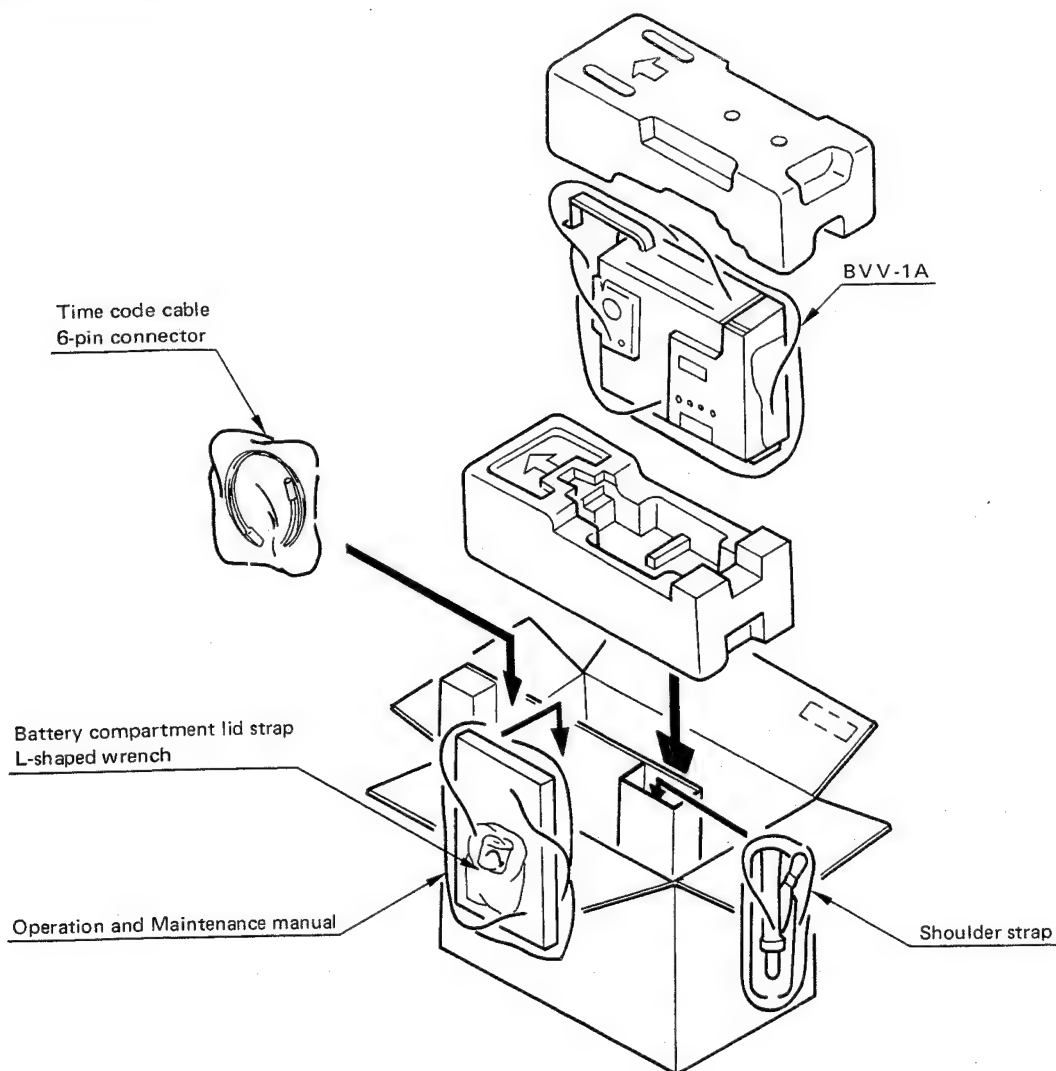
Cassette tape BCT-5K/10K/20K/30K

Betacam VTR BVW-10, BVW-20, BVW-40

Composite adaptor (14 pin) VA-1V

Component adaptor (26 pin) VA-1

### 1-12. PACKING



## SECTION 2

### TECHNICAL INFORMATION

#### 2-1. SPECIFICATIONS

##### 2-1-1. Specifications

#### GENERAL

##### MECHANICAL

Weight	BVV-1A	3.5 kg
	Battery Pack, NP-1	680 g
	Video cassette tape, HG-20	200 g
Dimensions		112 x 203 x 232 mm (4-2/1 x 8 x 9-1/4 inches) (w/h/d)
Video cassettes		HG-20 cassette (1/2-inch cassette for Beta format) and equivalent
Tape speed		118.6 mm/s
Wow/flutter		Less than 0.15% rms (with standard playback machine)
Continuous recording time		About 50 minutes with fully charged NP-1 battery pack
Recording time		20 minutes (with HG-20 cassette tape)
Operating temperature		0°C to +40°C (32°F to 104°F)
Operating humidity		Less than 80% (relative humidity)
Storage temperature		-20°C to +60°C (-4°F to +140°F)
Operating position		Horizontal or vertical

##### CONNECTOR

CAMERA	50-pin connector
AUDIO IN CH-1/CH-2	XLR female connector
EARPHONE	Mini jack
TIME CODE IN	6-pin male connector
TIME CODE OUT	6-pin female connector

##### ELECTRICAL

Power requirement	DC 12 V +4.0, -0.5 Using NP-1 battery pack (Ni-Cd, 1.5Ah) AC power can also be supplied Using AC-500, ac adaptor (optional)
Power consumption	10 W (12 V 830 mA) 2.4 W in power save mode

##### VIDEO

Video recording system	Y	FM
	C	Compressed time division multiplexed: FM
Input	Y	1.0 Vp-p 1k ohm unbalanced
	R-Y	0.7 Vp-p 1k ohm unbalanced
	B-Y	0.7 Vp-p 1k ohm unbalanced
	SYNC	5 Vp-p (TTL level)

Band width	Y	30 Hz to 4.1 MHz +0.5 dB, -6.0 dB
	C	(R-Y) 30 Hz to 1.5 MHz +0.5 dB, -3.0 dB
		(B-Y) 30 Hz to 1.5 MHz +0.5 dB, -3.0 dB
Signal-to-noise ratio	Y	More than 48 dB
	AM	More than 50 dB
	PM	More than 50 dB
K factor (2T pulse)		Less than 3%
Y/C delay		Less than 20 nsec

#### AUDIO

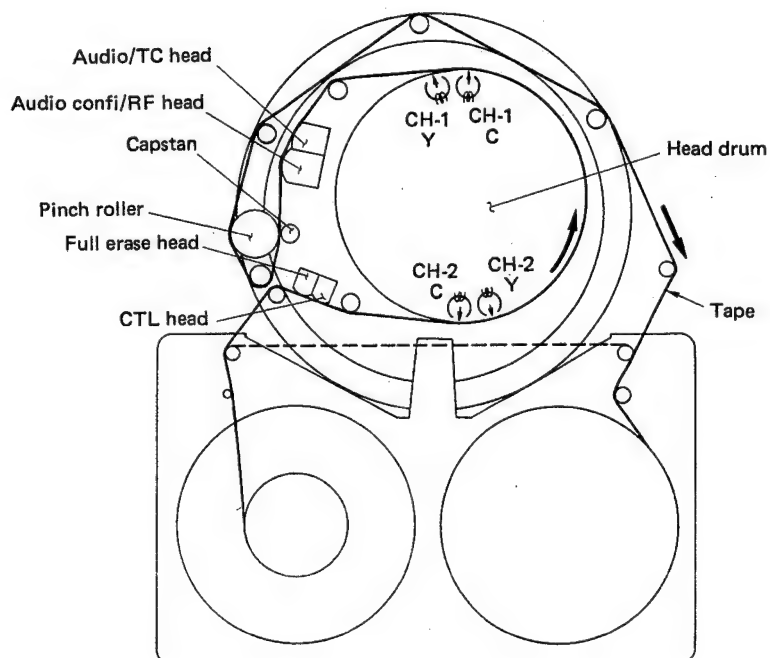
Input	MIC	-60 dB 3k ohms balanced (matches 600-ohm microphones)
	LINE	+4 dB 10k ohms balanced
Output	Speaker, earphone	Matches 8-ohm earphone
	Maximum output	-20 dB max. (variable)
Frequency response		50 Hz to 15k Hz $\pm 3$ dB (with standard playback machine)
Distorsion		Less than 2% (with 1kHz reference level, standard playback machine)
Signal-to-noise ratio		Better than 50 dB (3% distorsion, with standard playback machine)

#### TIME CODE

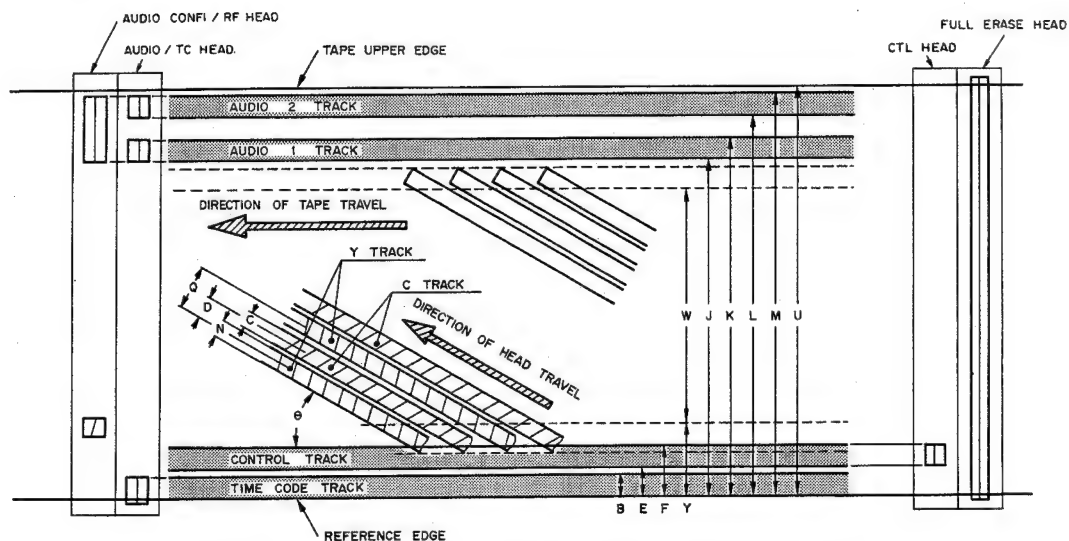
Input	TIME CODE	0.5 ~ 5 Vp-p 10k ohms unbalanced
	GEN-LOCK VIDEO	1 Vp-p $\pm 3$ dB 75 ohms
Output	TIME CODE	3 $\pm 0.5$ Vp-p 3k ohms unbalanced (10k ohm load)
	GEN-LOCK VIDEO	1 Vp-p $\pm 1$ dB 75 ohms

## 2-1-2. Tape Format

### TAPE TRANSPORT



### TAPE PATTERN



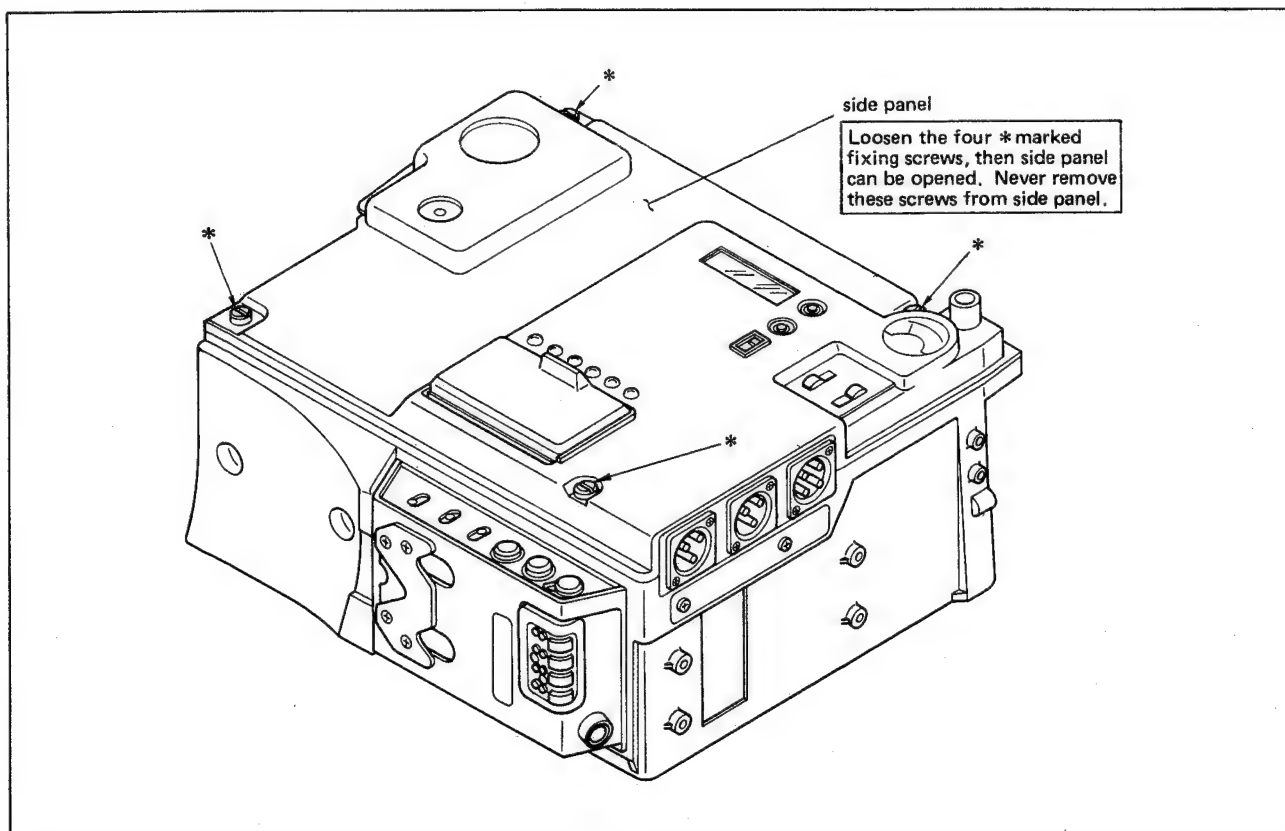
Unit: mm			
B : Time Code Track Upper Edge	0.4	L : Audio 2 Track Lower Edge	11.85
C : C Track Width	0.073	M : Audio 2 Track Upper Edge	12.45
D : Y-C Track Pitch	0.0805	N : Y Track Width	0.073
E : Control Track Lower Edge	0.7	Q : Video Track Pitch	0.161
F : Control Track Upper Edge	1.1	U : Tape Width	12.7
J : Audio 1 Track Lower Edge	10.85	W : Video Area Effective Width	9.384
K : Audio 1 Track Upper Edge	11.45	Y : Lower Limit of W	1.248
		Θ : Track Angle	4.679°

## 2-2. SETTING OF SYSTEM SELECT CIRCUIT AND ADJUSTMENT OF WARNING SOUND LEVEL

Along with the select switches and controls that are located on the side panel, the internal system select circuit and warning sound control are located on the circuit boards. The function of these internal circuit and control on the circuit board are described. These internal circuit and control must be used according to systems and conditions.

### (1) Opening of Side Panel

Open the side panel. Then the following system selection and control setting are become possible.



(2) Selection of Drop-frame or Non-drop-frame  
(TC board : J1)

Select either drop-frame display or non-drop-frame display for the TAPE TIMER or TIME CODE DISPLAY.  
For drop-frame display : Open  
For non-drop-frame display : Short  
When the set is shipped, it is set to the drop-frame display.

(3) Level Control of Warning Sound (VA board: RV703)

The output level of both the audio and warning sound from speaker or earphone can be controlled at the same time by the LEVEL CONTROL knob on the side panel. But only the warning sound level can be controlled independently. This level control is performed by RV703 on VA board. When the set is shipped, it is set to the maximum output level.

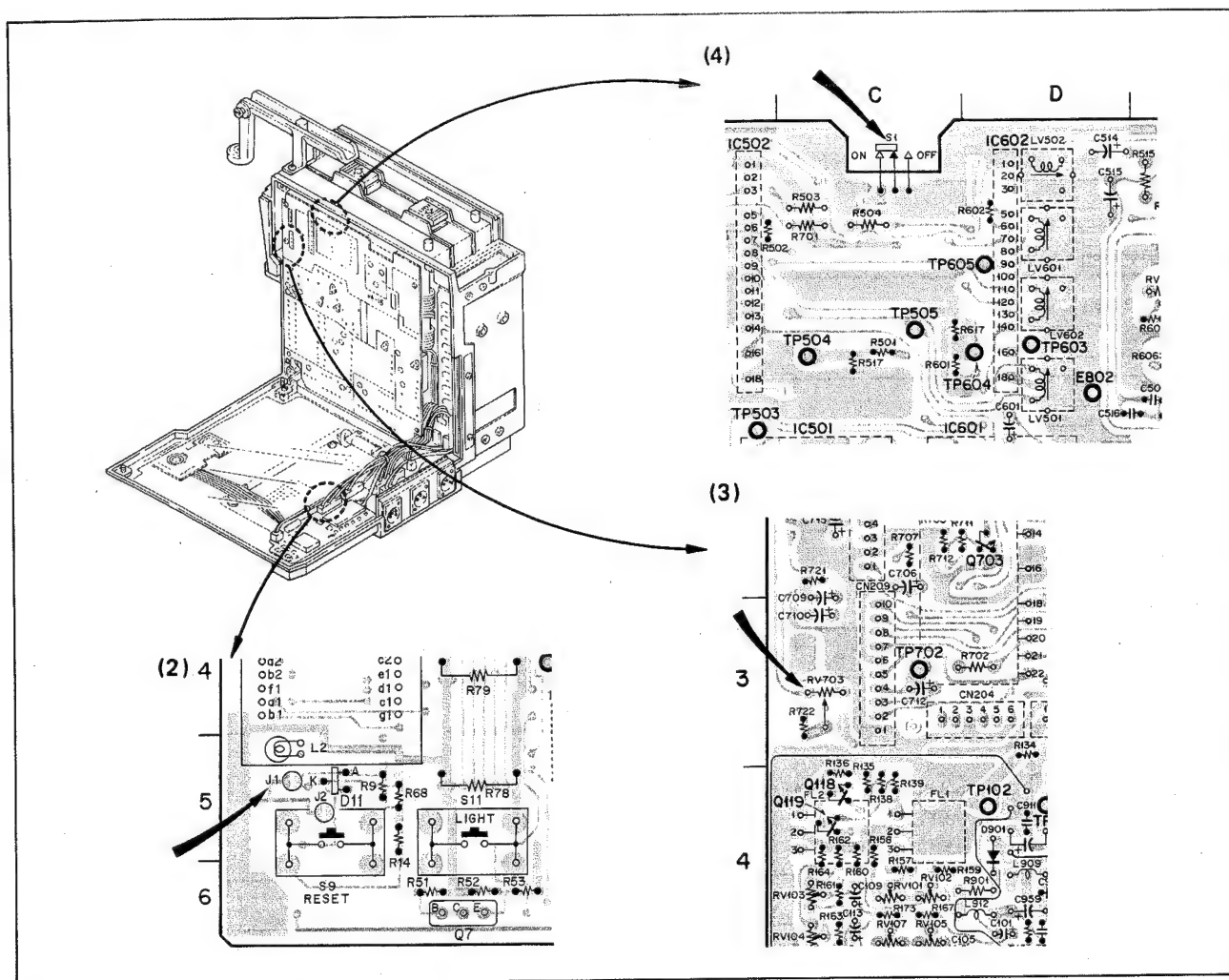
(4) Audio Noise Reduction ON/OFF Switch  
(VA board : S1)

Select for audio noise reduction on or off.

Noise reduction ON : ON

Noise reduction OFF: OFF

When the set is shipped, it is set to the noise reduction OFF state.



## 2-3. INPUT/OUTPUT SIGNAL OF THE CONNECTOR

Input and output signals of the connector are as follows:

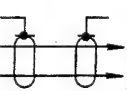
### AUDIO IN (CH-1/L, CH-2/R)

MIC IN : -60 dB 3k ohms balanced (matches 600-ohm microphone)  
 LINE IN : +4 dB 10k ohms

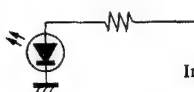

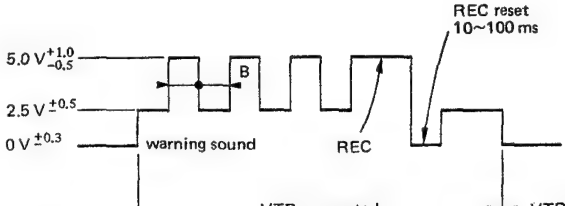
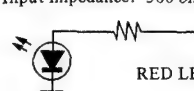
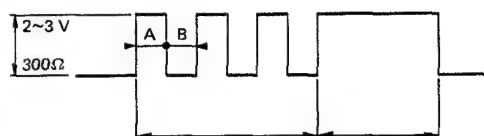
### DC IN










DC IN : +12 V, more than 3 A (1 pin: GND, 2 pin: NC, 3 pin: NC, 4 pin: +12 V)  
 EXT.BATTERY : +12 V (1 pin: +12 V, 2 pin: +12 V, 3 pin: GND, 4 pin: GND, 5 pin: NC)  
 IN (When battery pack output voltage decrease to 11.45 Vdc, the warning sound and the lamp in viewfinder tell that the battery is reaching its usable end. When voltage becomes 11.0 V, warning sound and viewfinder lamp tell that the battery has reached its end while VTR stops its operation.)

CAMERA 50P :

Pin No.	I/O Signal	Specifications		
		Camera Side	Direction	VTR Side
1	_____			
2	_____			
3	_____			
4	_____			
5	GND (Power)			
6	GND (Power)			
7	_____			
8	_____			
9	_____			
10	_____			
11	_____			
12	_____			
13	_____			
14	_____			
15	MIC (G)	Low impedance (lower than 600 ohms) balanced, -60 dBm		Input impedance: 3 k ohms ~ 10 k ohms balanced
16	MIC (X)			
17	MIC (Y)			
18	_____			
19	_____			



Pin No.	I/O Signal	Specifications								
		Camera Side	Direction	VTR Side						
20	Audio CH-1 Indicate	$Z_i \geq 1 \text{ K}\Omega$	←	$Z_o$ : Low impedance Level : $-15\text{dBs} \pm 1$ at REF level						
21	_____									
22	TAPE IND. 1 (10M)	 $I_{\text{max}} = 10 \text{ mA}$	←	$H = 4.5 \text{ V}^{+0.5}_{-0.5}$ (camera side open) $L = 0 \text{ V}^{+0.5}_{-0.5}$ Output impedance: $330 \text{ ohms} \pm 5\%$						
23	TAPE IND. 2 (5M)	 $I_{\text{max}} = 10 \text{ mA}$	←	$H = 4.5 \text{ V}^{+0.5}_{-0.5}$ (camera side open) $L = 0 \text{ V}^{+0.5}_{-0.5}$ Output impedance: $330 \text{ ohms} \pm 5\%$						
24	REC/TALLY	Input impedance: $20 \text{ k ohms}$	←	 <p>A/B : <math>50 \pm 10\%</math> duty frequency <math>1 \pm 0.2 \text{ Hz}</math> or <math>4 \pm 0.8 \text{ Hz}</math></p>						
25	BATT IND	Input impedance: $300 \text{ ohms}$  RED LED	←	 <p>14.5 Vmax open, <math>2 \sim 3 \text{ V}</math> with <math>300 \text{ ohms}</math> load A/B : <math>50 \pm 10\%</math> duty frequency <math>1 \pm 0.2 \text{ Hz}</math> or <math>4 \pm 0.8 \text{ Hz}</math> ** Before end: <math>11.45 \text{ V}</math> Under cut: <math>11.0 \text{ V}</math></p>						
26	_____									
27	VTR START/STOP	$5 \text{ V}^{+1.0}_{-1.0}$ Output impedance: less than $10 \text{ k ohms}$ START: $5 \text{ V}^{+1.0}_{-1.0}$ STOP: $0 \text{ V}^{+0.2}_{-0.1}$	→	START: $5 \text{ V}^{+3.0}_{-1.0}$ STOP: $0 \text{ V}^{+0.5}_{-0.5}$						
28	_____									
29	R-Y VIDEO (X)	$0.7 \text{ Vp-p}$ (75% color bars) Output impedance: $75 \text{ ohms} \pm 5\%$ DC: $0 \pm 200 \text{ mV}$	↔	Input impedance: $1 \text{ k ohms} \pm 5\%$						
30	R-Y VIDEO (G)									
31	Audio CH-1 Level Control	DC $0 \text{ V} \sim$ more than $7 \text{ V}$	→	$Z_i \geq 100 \text{ K}\Omega$ <table data-bbox="859 1834 1214 1993"><tr><th>DC</th><th>CH-1 GAIN</th></tr><tr><td><math>0 \text{ V}</math> or open</td><td>Ref level</td></tr><tr><td><math>7 \text{ V}</math></td><td>less than <math>-20 \text{ dB}</math></td></tr></table>	DC	CH-1 GAIN	$0 \text{ V}$ or open	Ref level	$7 \text{ V}$	less than $-20 \text{ dB}$
DC	CH-1 GAIN									
$0 \text{ V}$ or open	Ref level									
$7 \text{ V}$	less than $-20 \text{ dB}$									

Pin No.	I/O Signal	Specifications		
		Camera Side	Direction	VTR Side
32	VTR SAVE	4.5 V $\pm$ 0.5 V (STANDBY: 0 V or open) Output impedance: less than 10 k ohms		Input impedance: more than 100 k ohms (VTR should be in SAVE mode when camera is in PREHEAT.)
33	AUDIO MONITOR	750 $\Omega$ /1 kHz		Low impedance Level: -6 dBs
34	SYNC (  )	$V_{OH} = 5 \text{ V}^{+0.2}_{-1.0}$ , $I_{OH} = 1 \text{ mA max}$ $V_{OL} = 0.8 \text{ V max}$ , $I_{OL} = -1.5 \text{ mA max}$		
35	_____			
36	REW CONTROL	Input impedance: 100 k ohms $\pm$ 5%		REW: 4.5 V $\pm$ 0.5 V NORMAL: 0 V $\pm$ 0.5 V Output impedance: 10 k ohms $\pm$ 5%
37	_____			
38	_____			
39	+12 V (Power)			10.6 V min (at 3 A), 14.5 V max
40	+12 V (Power)			
41	LUMINANCE (X)	1.0 Vp-p DC: 0 $\pm$ 200 mV Output impedance: 75 ohms $\pm$ 5%		Input impedance: 1 k ohm $\pm$ 5%
42	LUMINANCE (G)			
43	_____			
44	_____			
45	_____			
46	_____			
47	_____			
48	_____			
49	B-Y VIDEO (X)	0.7 Vp-p Output impedance: 75 ohms $\pm$ 5% DC: 0 $\pm$ 200 mV (75% color bars)		Input impedance: 1 k ohm $\pm$ 5%
50	B-Y VIDEO (G)			

## 2-4. CONNECTORS FOR OPTIONAL CONNECTION

When external cables are connected to the connectors on the set during the maintenance, hardwares as stated below or the equivalents must be used.

AUDIO IN                    1-508-084-00  
                                 CONNECTOR, 3P, MALE

DC IN                      1-508-362-00  
                                 PLUG, XLR, 4P, FEMALE

EXT.BATTERY IN        1-560-976-00  
                                 PLUG, 5P

CAMERA                   1-562-112-21  
                                 CONNECTOR, 50P, MALE

TIME CODE IN           1-562-641-11  
                                 CONNECTOR (P-F)

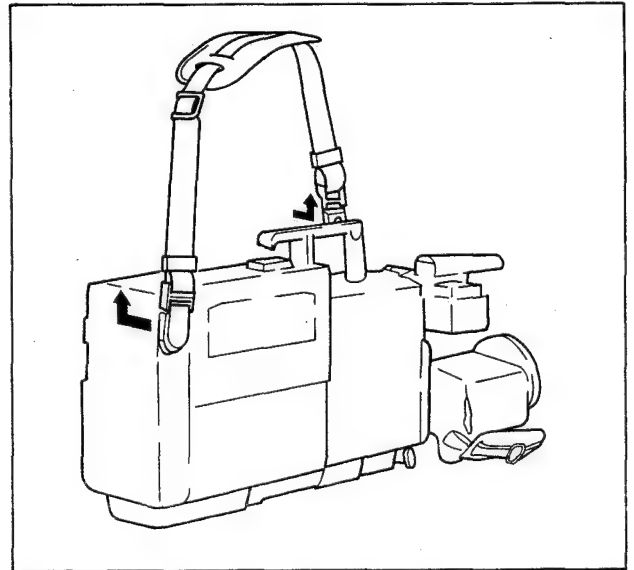
TIME CODE OUT        1-564-688-11  
                                 CONNECTOR (P-M)

## 2-5. SUPPLIED ACCESSORY

Supplied BVV-1A accessories are as follows:

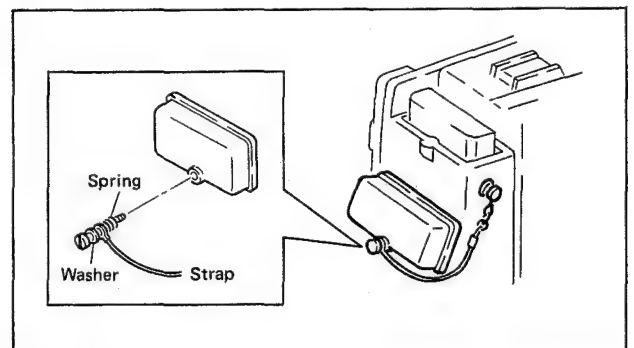
### (1) Shoulder Strap

The shoulder strap can be attached to the BVV-1A and the machine carried on the operator's shoulder. Both ends of the strap are attached to the knob of the machine with one operation.



### (2) Battery Cover Strap

The battery cover strap is used to prevent losing the battery cover. Installing procedure is shown in figure.



### (3) 50P connector Cap

The 50P connector cap is used for preventing dust or rain from going into 50P connector when the BVV-1A is carried as the single unit or kept in the broadcast station as the single unit.

### (4) Screw

These screws are used for installing the VTR into camera.

### (5) Time-code Cable

### (6) Time-code Connector

## 2-6. OPTIONAL ACCESSORY

The followings are provided as the optional accessory. The suitable accessory can be used for each system.

### (1) Color Video Camera : BVP-30

BVP-30 employs 2/3 inch "PLUMBICON" in three pick-up tubes. The BETACAM system is composed by BVV-1A and BVP-30.

### (2) Color Video Camera : BVP-3A

BVP-3A employs 2/3 inch "SATICON" in three pick-up tubes. The BETACAM system is composed by BVV-1A and BVP-3A.

### (3) Battery Pack : NP-1

### (4) Battery Charger : BC-1WA

The BC-1WA battery charger is designed to charge NP-1 battery packs.

Four NP-1 battery packs can be inserted at one time, and will be charged in sequence automatically. Charging time of a battery pack can be as far as 1 hour.

### (5) AC Adaptor : AC-500

The BVV-1A can be driven by an AC power source by connecting the AC adaptor, AC-500. This AC-500 is worldwide type of adaptor. AC-500 can be used with 100/120/220/240V commercial power supplies just by setting the voltage selector to the appropriate position for a stable supply of DC power.

### (6) Earphone : ME-20B

The audio simultaneous playback sound (mixed sound of CH-1 and CH-2) in the REC mode can be monitored by connecting this ME-20B with EARPHONE jack of BVV-1A. In other modes (except REC mode), the selected EE sound (selected by AUDIO IN and CH SELECT) can be monitored.

### (7) Battery Case : DC-100

The long time operation can be performed by adding an optional battery pack, NP-1, to the internal battery pack. The battery case, DC-100 is a case of an optional battery pack. This DC-100 can be attached to the VTR easily.

### (8) Wireless Microphone System

UHF portable tuner : WRR-27

Transmitter : WRT-27

Wireless microphone : WRT-57

The audio sound can be recorded on the tape without wire cable by using these wireless microphone system.

### (9) VTR Component Adaptor : VA-1

### (10) VTR Composite Adaptor : VA-1V

## 2-7. USE UNDER SPECIAL ENVIRONMENT

### (MEASURE FOR COLD AREA)

The BVV-1A's quality guaranteed temperatures are from 5°C to 35°C while its operation guaranteed temperatures are from 0°C to 40°C.

When the equipment should be used outside the aforementioned temperature range, especially when used below these temperature, cover-cloth for cold temperature is recommended.

## 2-8. VTR AND CAMERA BLOCKS REMOVAL AND INSTALLING PROCEDURES

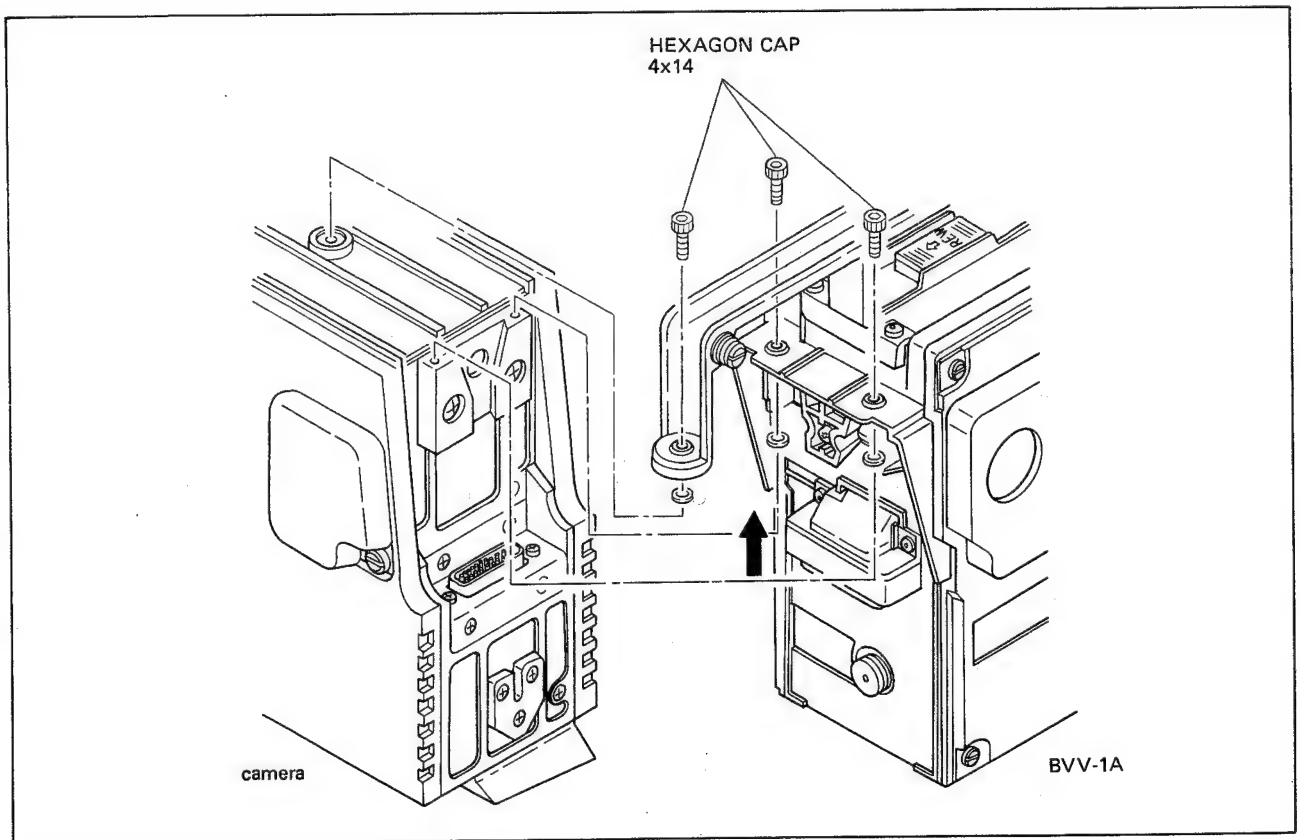
Disassembly and assembly procedures of the camera block and VTR block are follows:

### (1) Disassembly procedures

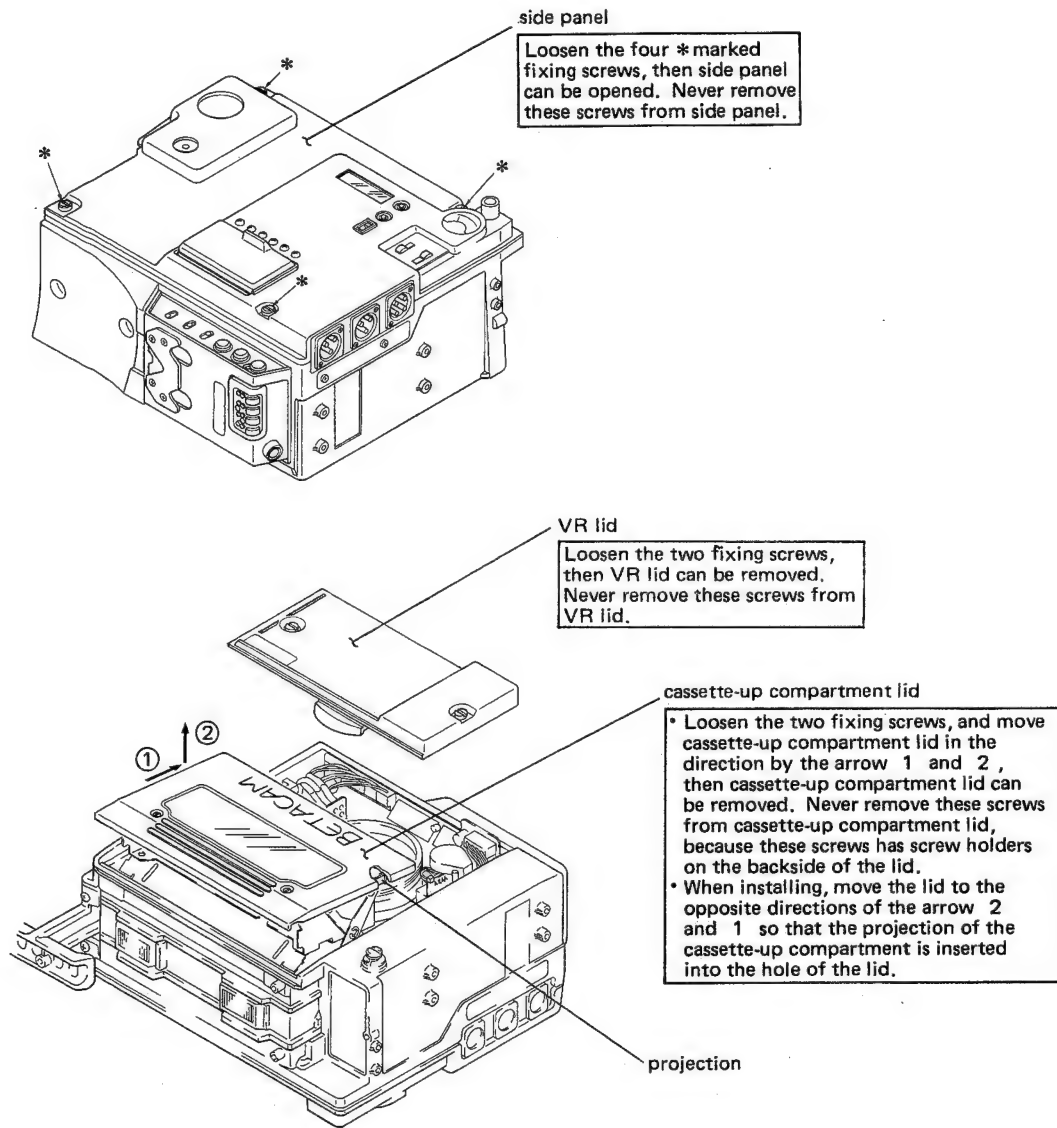
- (i) Remove three fixing screws as shown in figure.
- (ii) Disassembly the VTR by moving in the direction shown by arrow.

### (2) Assembly procedures

- (i) Assemble the VTR and camera by moving in the opposite directions shown by arrow.  
If the VTR's 50P connector cannot be inserted into the camera's connector, slightly move the the VTR's connector by hand.
- (ii) Tighten three fixing screws.

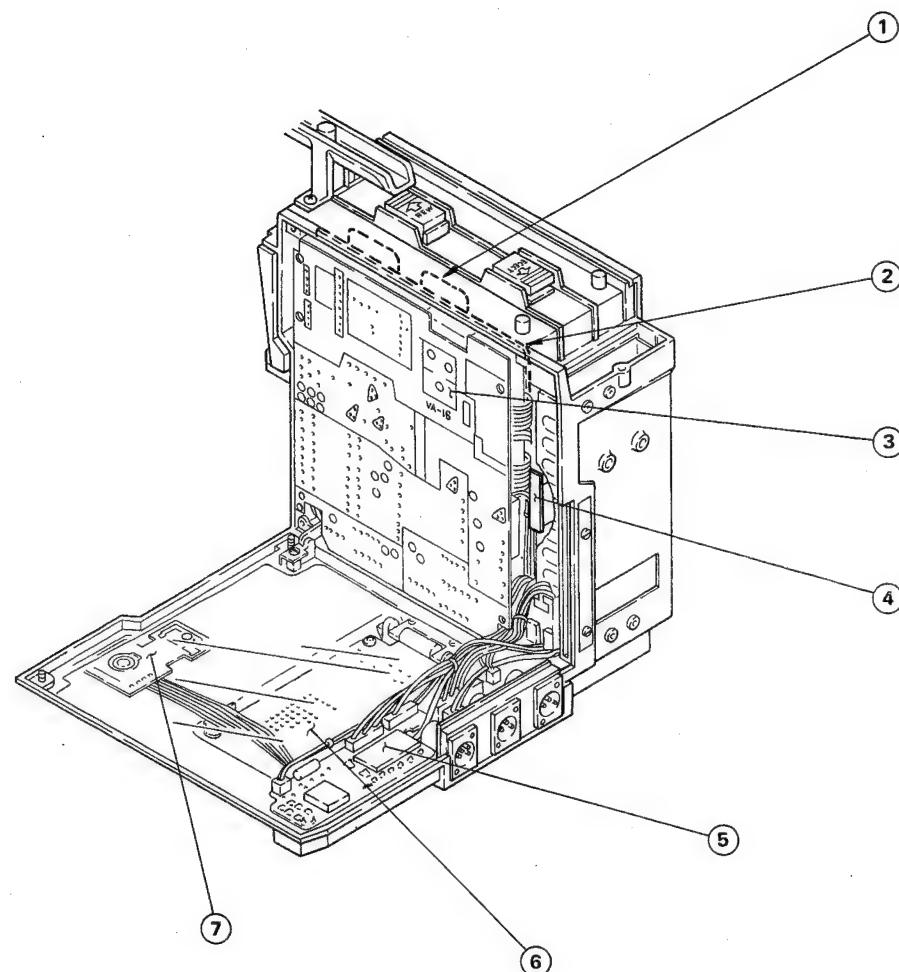


## 2-9. LEFT AND RIGHT SIDE PANELS REMOVAL PROCEDURE

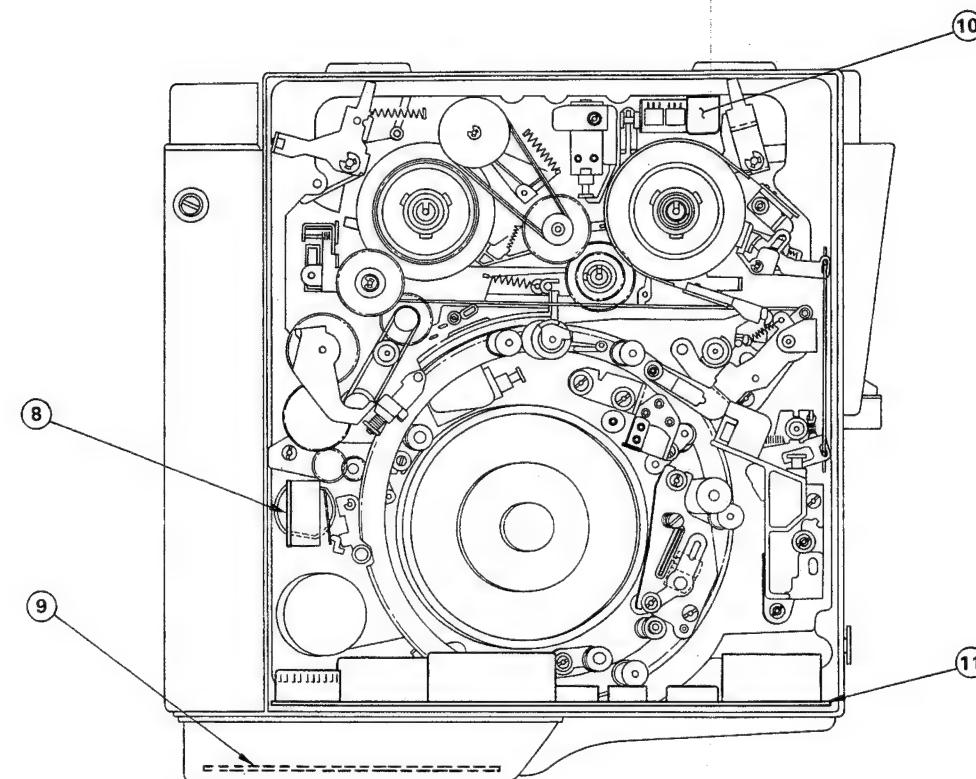


## 2-10. LOCATION OF MAIN PARTS

### 2-10-1. Location of the Printed Circuit Boards

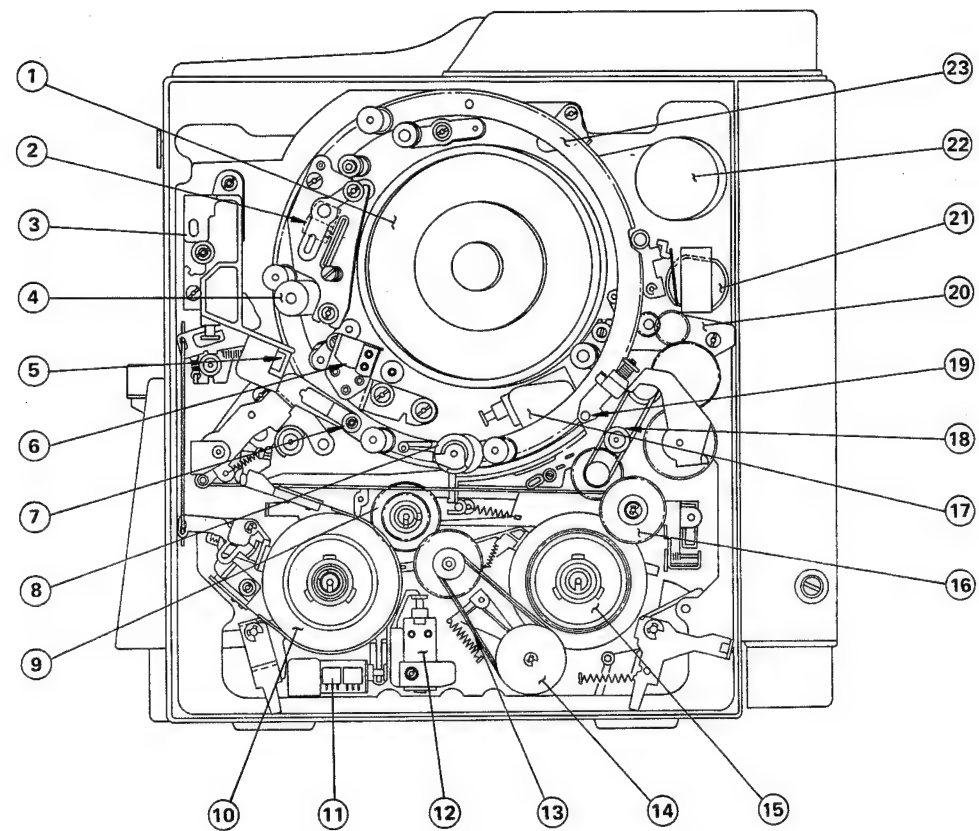


- ① FL-7 board
- ② SS-23 board
- ③ VA-16 board
- ④ BA-3 board
- ⑤ CP-49 board
- ⑥ TC-33 board
- ⑦ SP-10 board

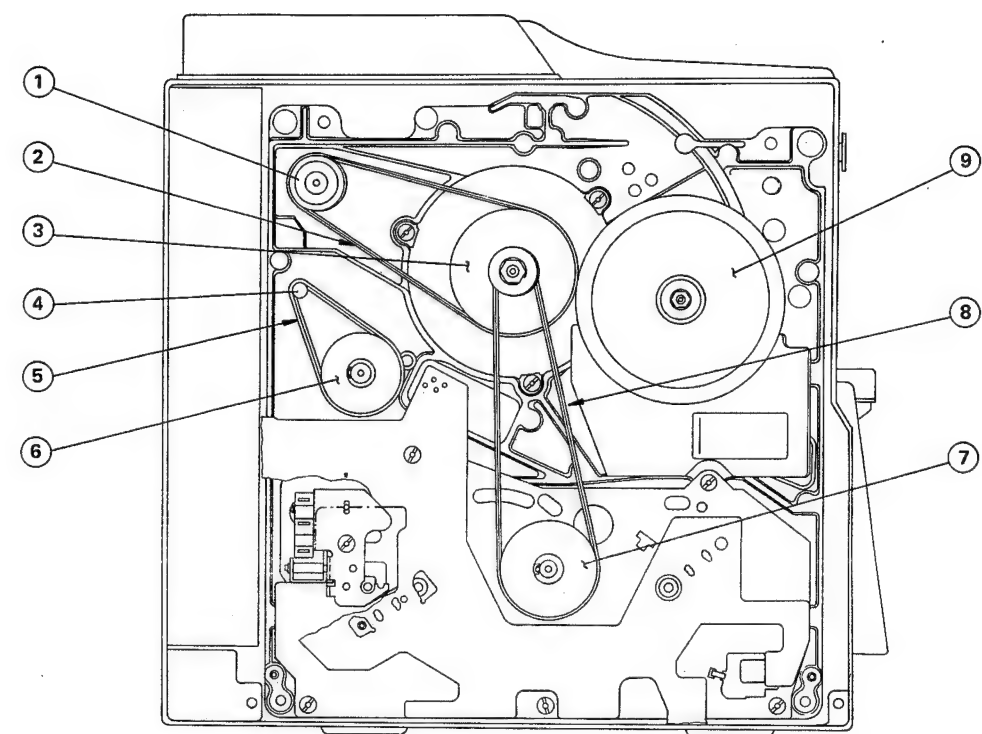


- ⑧ SW-82 board
- ⑨ LC-6 board
- ⑩ FL-7 board
- ⑪ TR-15 board

2-10-2. Location of the Mechanical Main Parts/Components



- |  |                      |
|--|----------------------|
| ① Head Drum                                | ⑬ FWD Belt           |
| ② Audio/Audio Confi./Video Confi./TC Heads | ⑭ FWD Pulley         |
| ③ Pinch Solenoid                           | ⑮ Take-up Reel Table |
| ④ Capstan                                  | ⑯ EJECT Pulley       |
| ⑤ Tape End Sensor                          | ⑰ EJECT Solenoid     |
| ⑥ CTL/Full Erase Heads                     | ⑱ EJECT Belt         |
| ⑦ Tension Regulator Arm                    | ⑲ Slant Guide        |
| ⑧ Pinch Roller                             | ⑳ Gear Block         |
| ⑨ REW Pulley                               | ㉑ Threading Motor    |
| ⑩ Supply Reel Table                        | ㉒ Drum Motor         |
| ⑪ Brake Solenoid                           | ㉓ Threading Ring     |
| ⑫ Idler Solenoid                           |                      |



- |                          |
|--------------------------|
| ① D Motor Pulley         |
| ② Drum Belt              |
| ③ Drum Pulley            |
| ④ Threading Motor Pulley |
| ⑤ Threading Motor Belt   |
| ⑥ Deceleration Pulley    |
| ⑦ Midway Pulley          |
| ⑧ Mechanical Belt        |
| ⑨ Capstan Motor          |



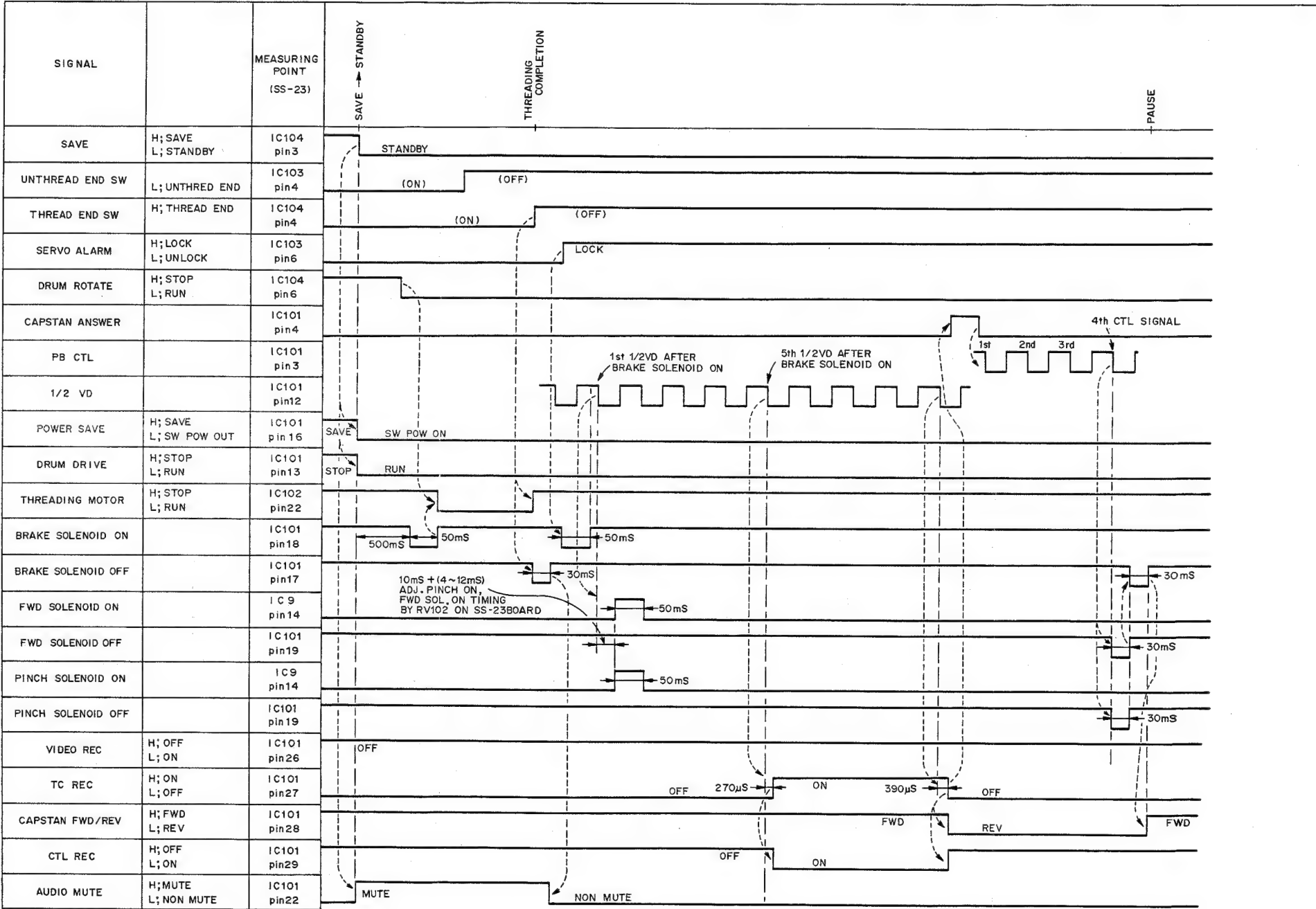
2-11. PRINTED CIRCUIT BOARDS

The circuit information is provided below.

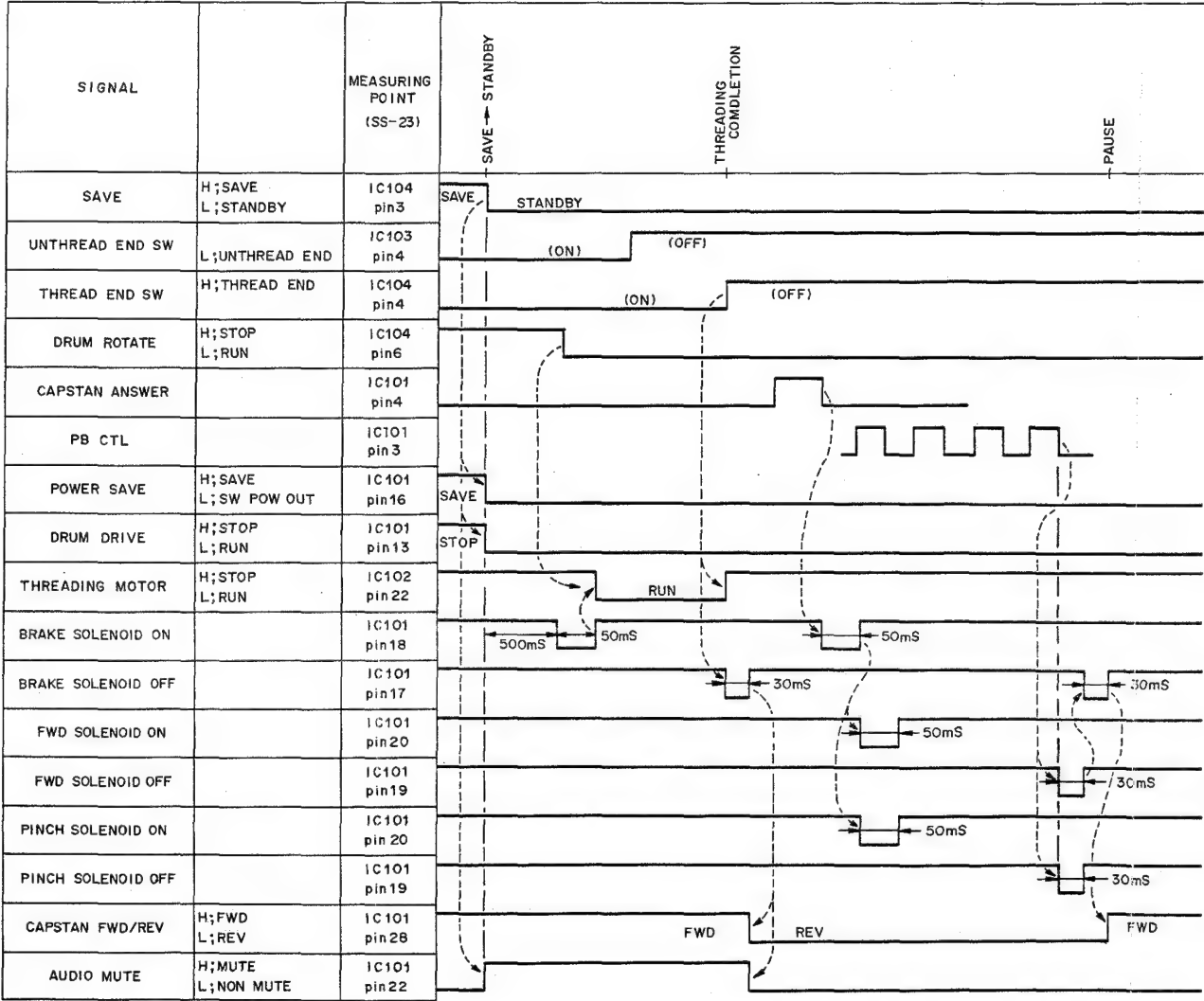
Board	Circuit function
VA-16 (RA-8, AL-6) (TG-5, PG-3) DU-18	Video recording system Audio recording system
SS-23	Servo system System control system
TR-15	CTL record amplifier Time code record amplifier Humid sensor Pinch solenoid driver Threading motor driver Drum motor driver
LC-6	Audio line amplifier Audio level control
TC-33	Time code generator
SP-10	Speaker amplifier
CP-49 DUS-34	Connector panel
SW-82	Unthread end detector
BA-3	Time code back-up battery
FL-7	Flexible harness board

2-12. TIMING CHART OF MAIN FUNCTION

THREADING → PAUSE OPERATION IN STANDBY MODE  
(The 1st time threading → PAUSE operation)

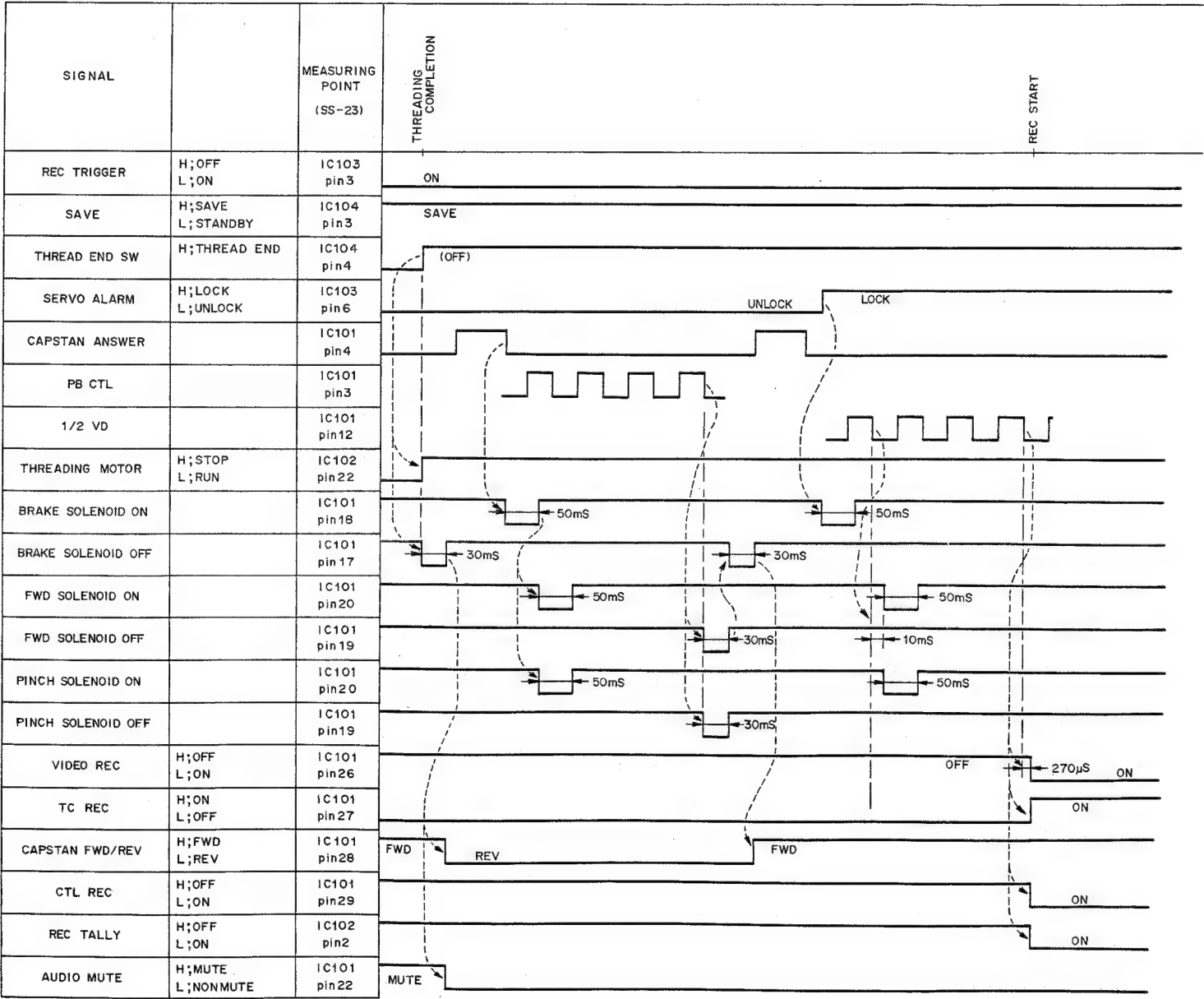


THREADING → PAUSE OPERATION IN STANDBY MODE  
(The 2nd or several times threading → PAUSE operation)

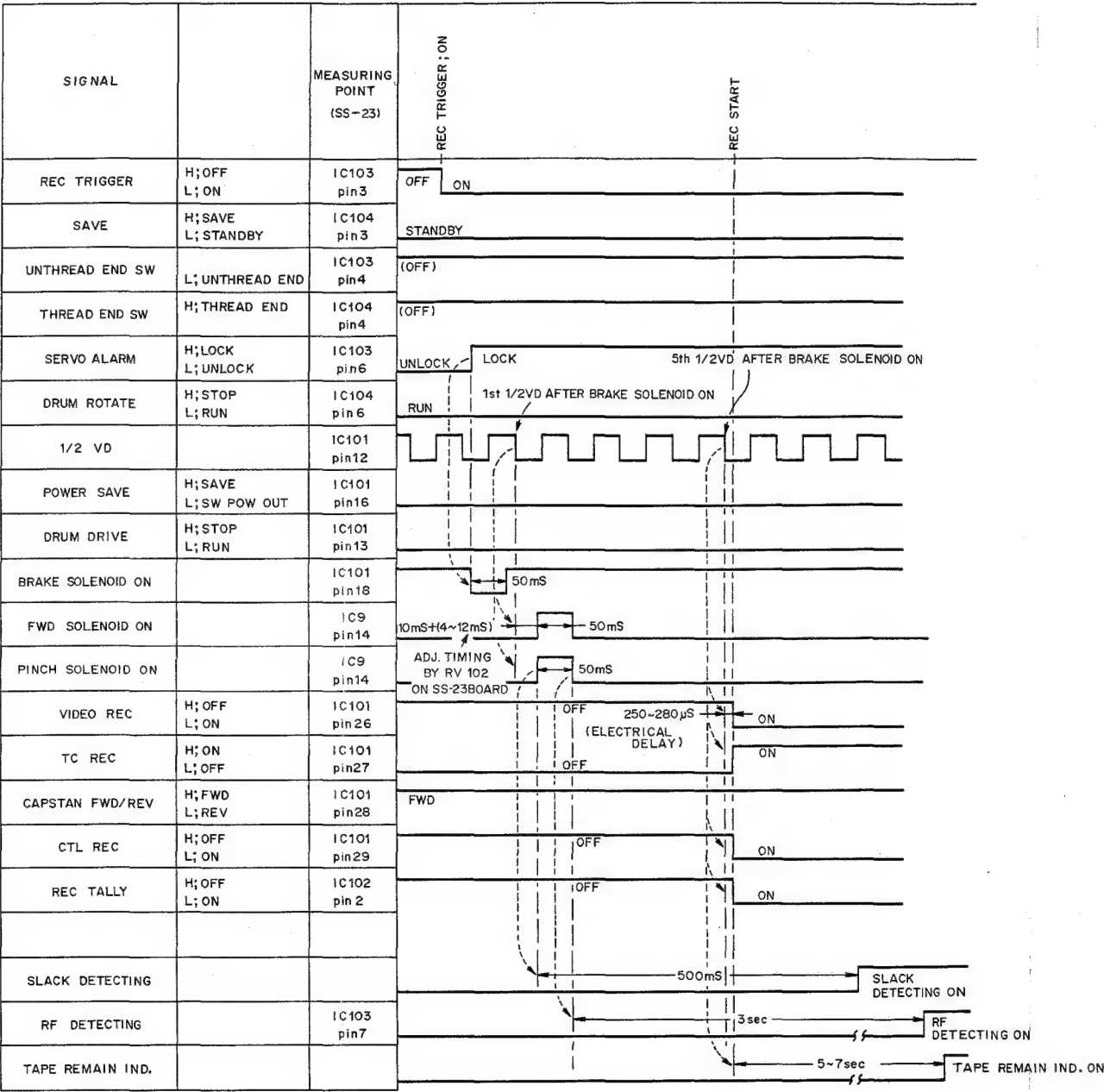


THREADING → REC OPERATION IN STANDBY MODE

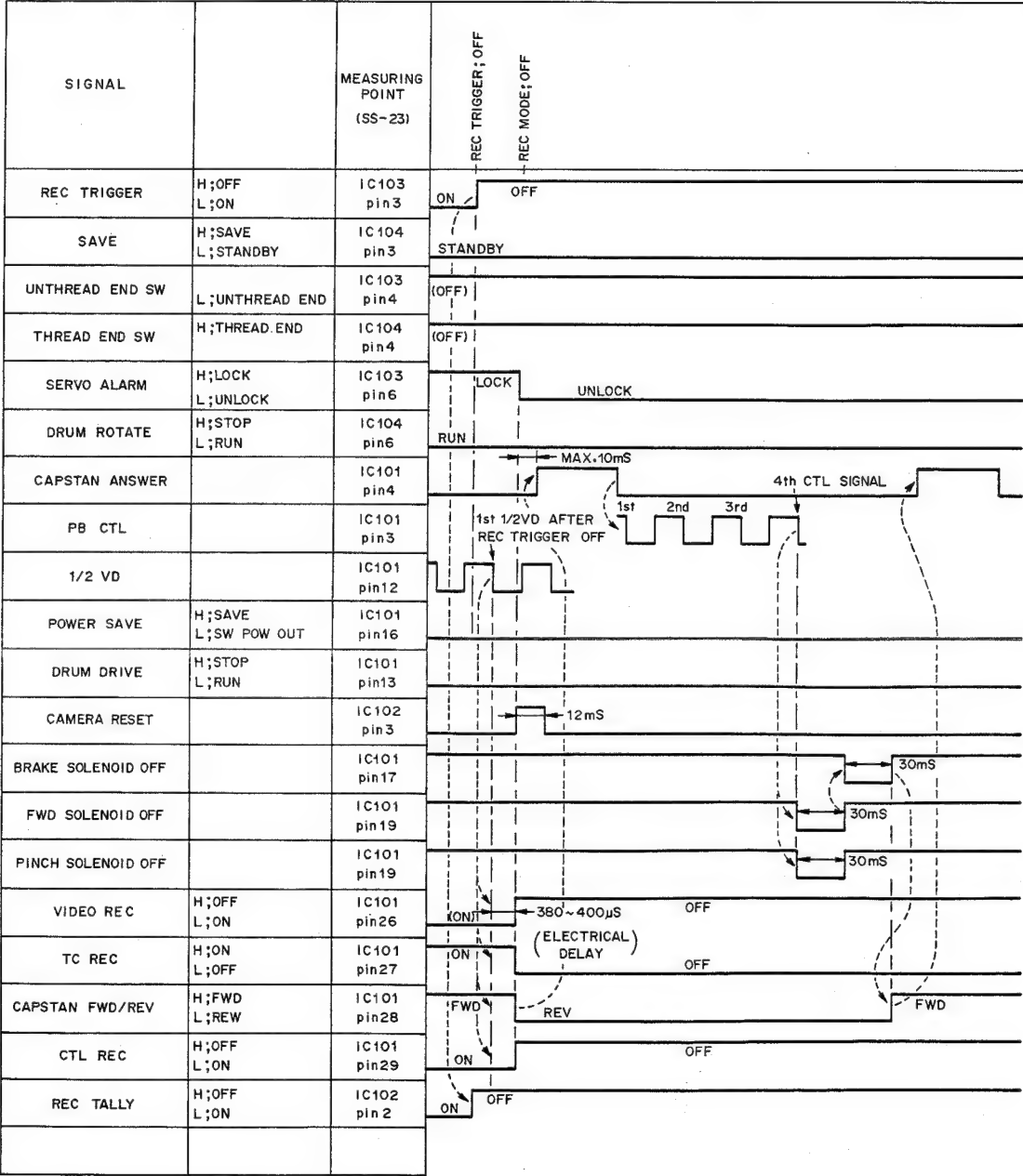
- . SAVE mode in several times → Threading mode → REC mode
- . Unthreading mode → Threading mode → REC mode



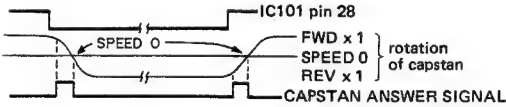
REC ON OPERATION IN STANDBY MODE



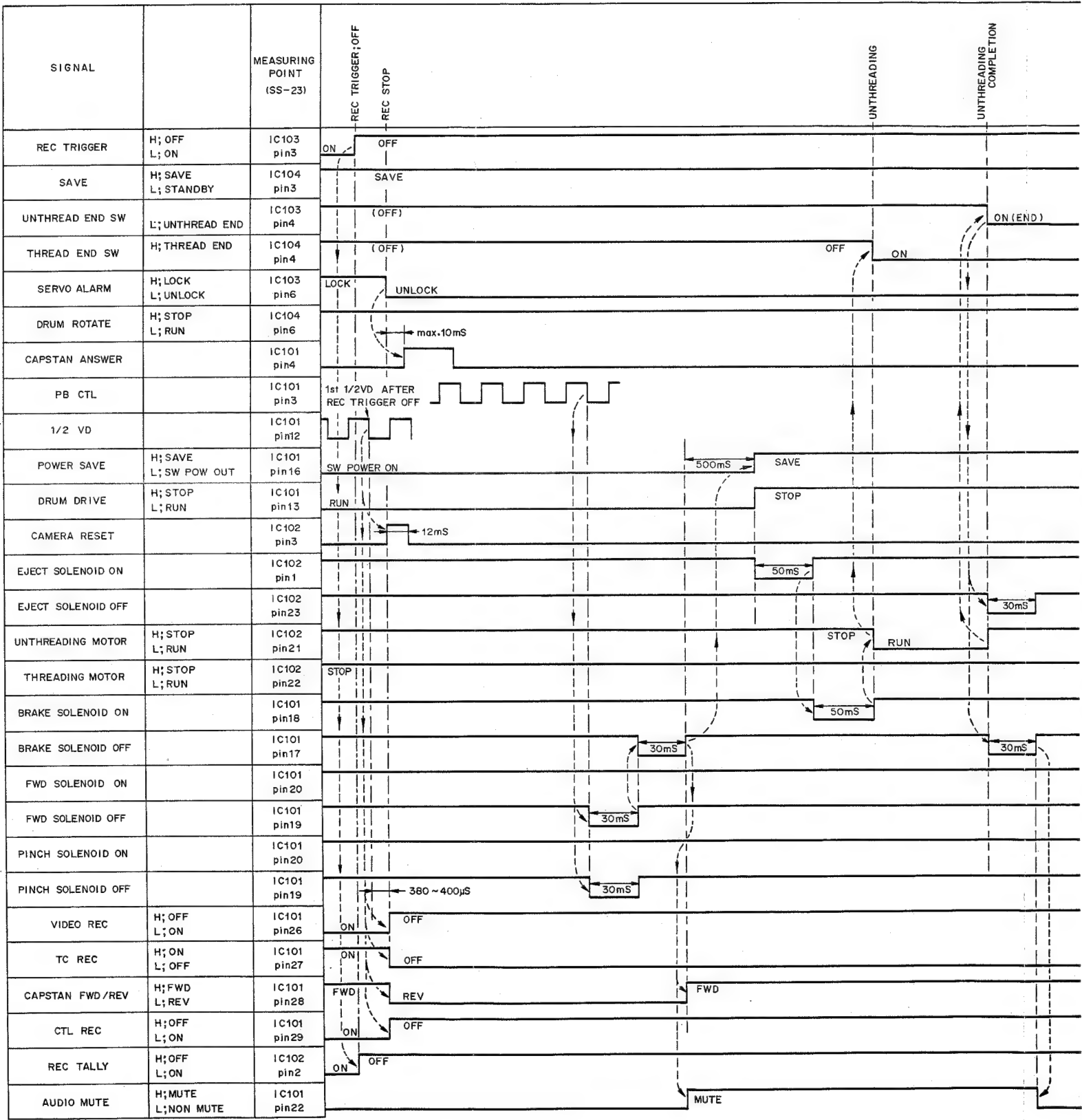
REC OFF OPERATION IN STANDBY MODE



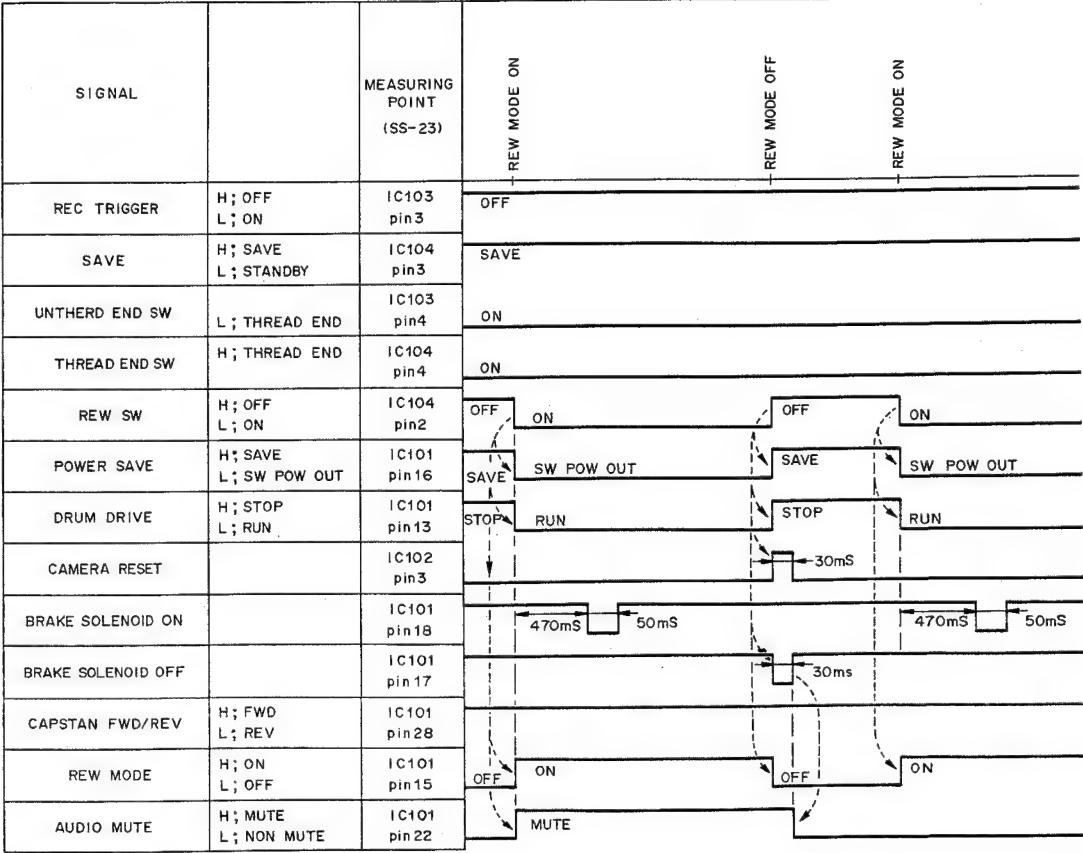
When the rotation of capstan changes from FWD to REV and from REV to FWD, capstan answer signal is generated.



REC OFF OPERATION IN SAVE MODE

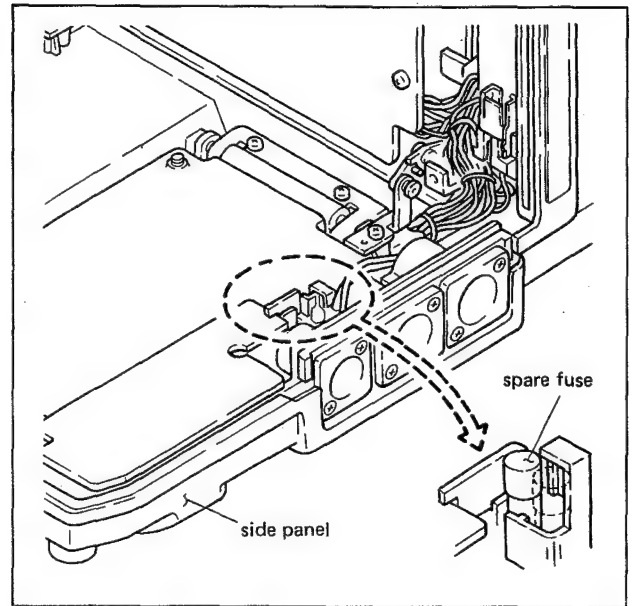


REW OPERATION



### 2-13. SPARE FUSE

The spare fuse of the fuse (ref.No. F1) mounted on CP-49 board is installed into the side panel as shown in figure. When necessary, replace the fuse with this spare fuse.



## SECTION 3

### PERIODIC CHECK AND MAINTENANCE

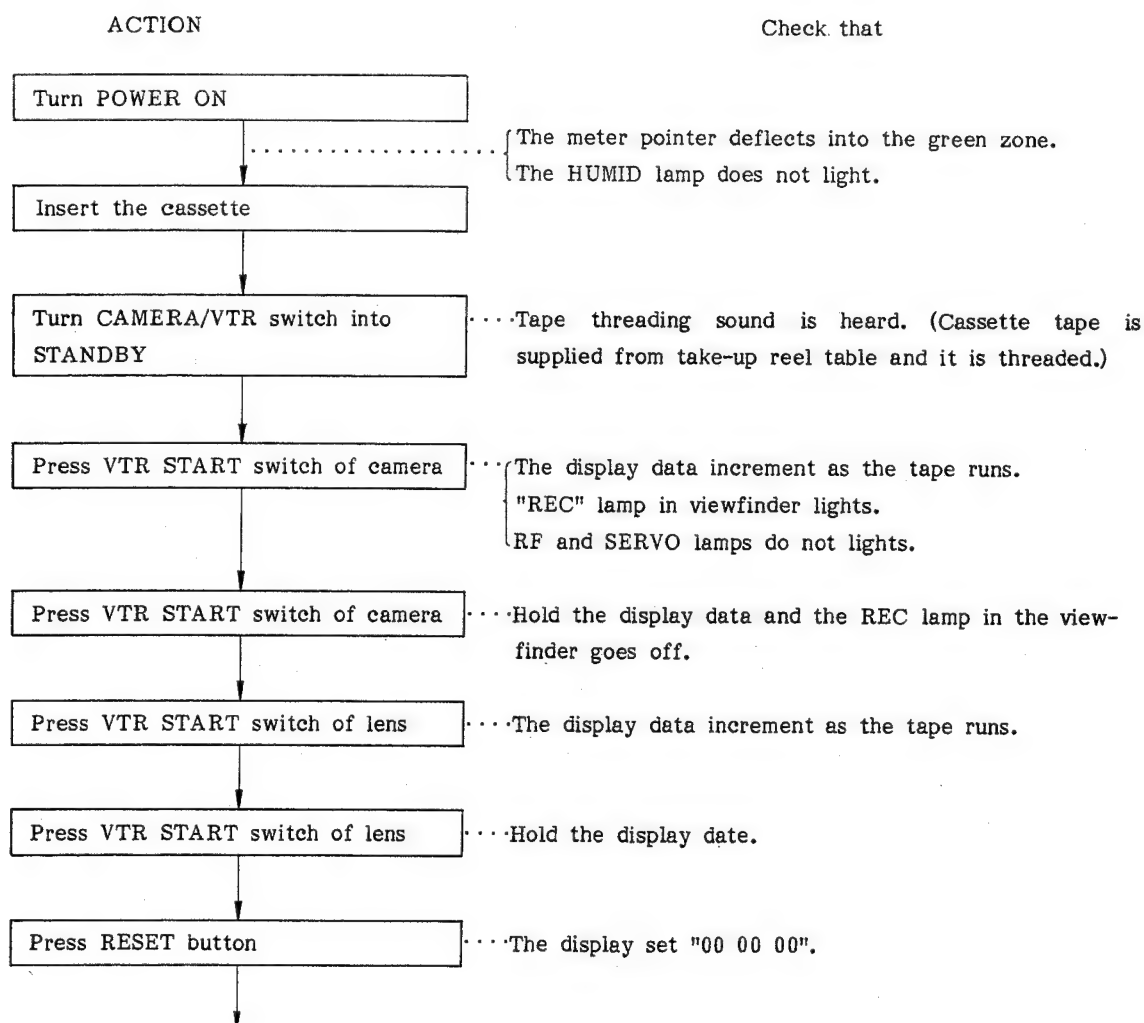
#### 3-1. PERIODIC CHECK

Before starting to the news gathering, it is recommended to check the system to operate normally by performing the following checks.

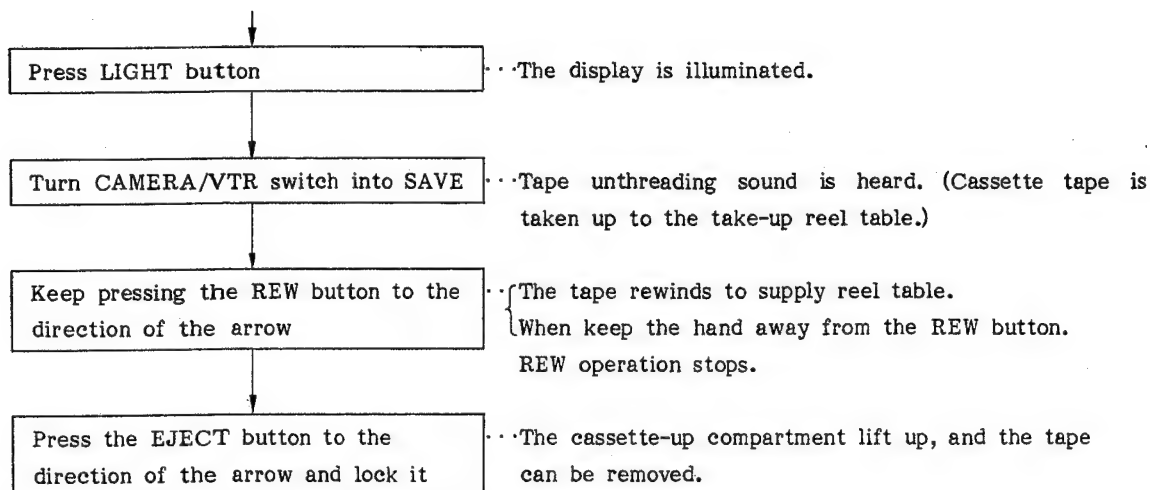
The periodic check for the camera block, refer to the "Operation and Maintenance Manual" of CAMERA. The check procedure described here is in the VTR connected with CAMERA but can be applied on the operation with other cameras.

##### 3-1-1. START, STOP, REW, EJECT, Functions Check

Equipment : Fully charged battery  
 With switches set to : POWER → ON  
                               TAPE TIMER/TIME CODE → TAPE TIMER  
                               CAMERA/VTR → SAVE  
                               METER SELECT → BATT







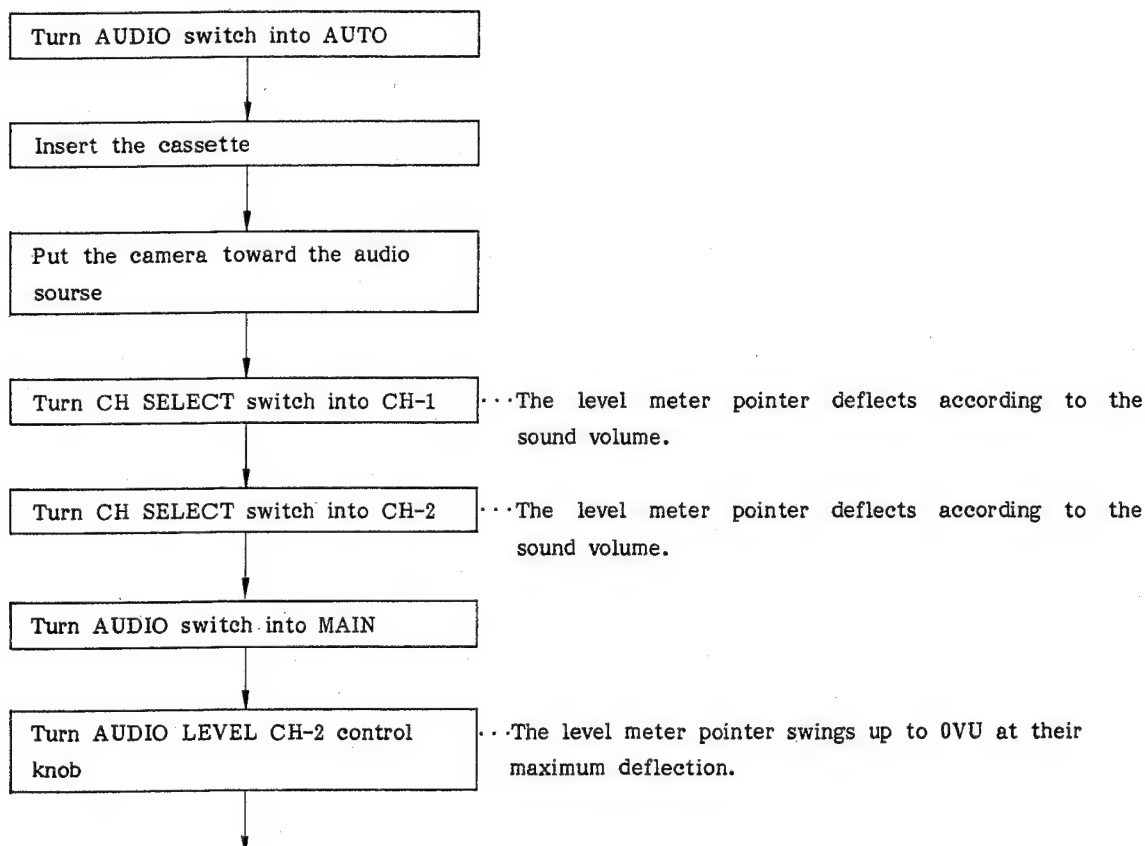
### 3-1-2. AUTO/MANUAL Function Check of the Audio Recording Level

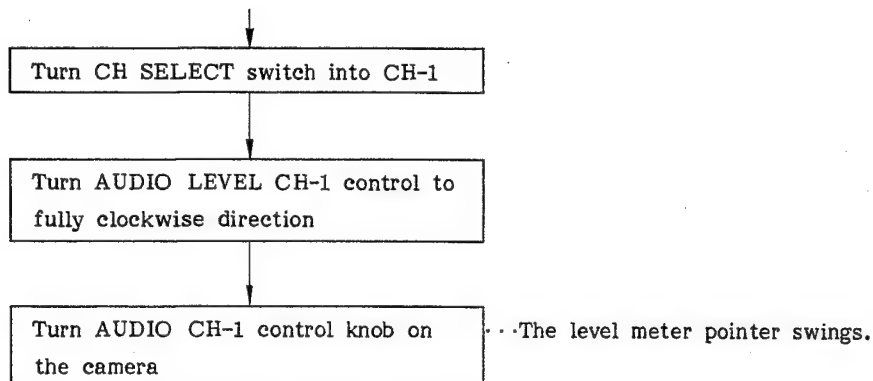
Equipment : Fully charged battery  
Cassette tape, HG-20

With switches set to : POWER → ON  
METER SELECT → AUDIO  
CAMERA/VTR → VTR STBY  
AUDIO IN CH-1/CH-2 → CAM

#### ACTION

#### Check that

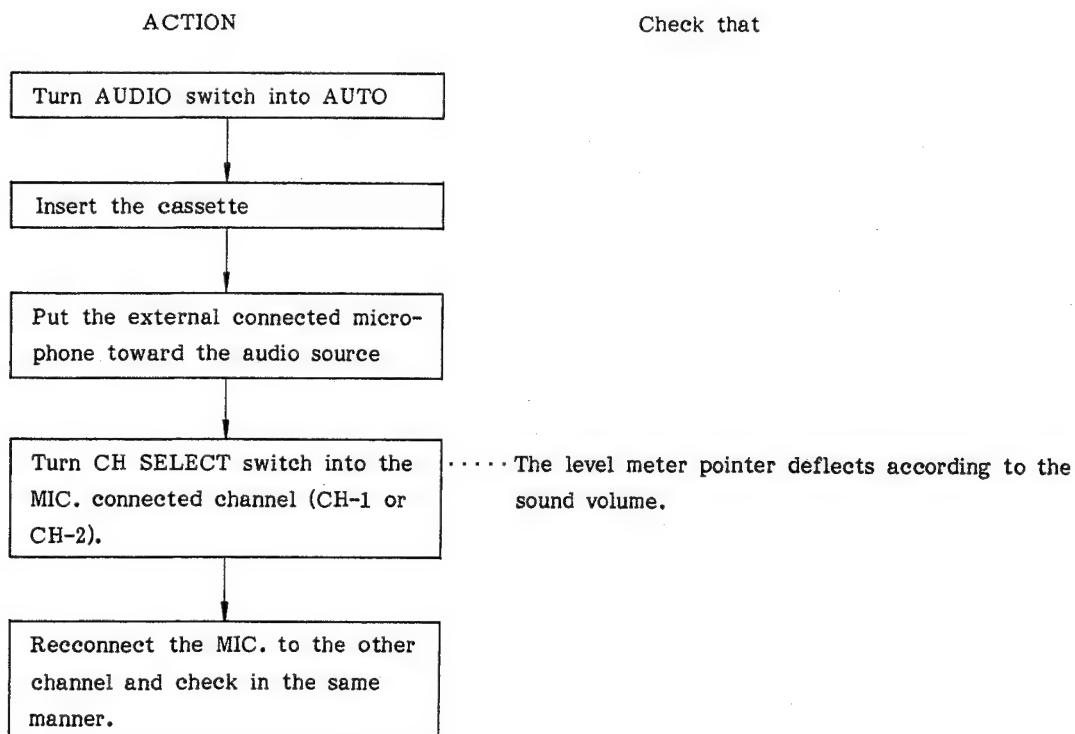




### 3-1-3. The External Microphone Connection Check

Equipment : Fully charged battery  
Microphone (600 ohms)  
Cassette tape

With switches set to : POWER → ON  
METER SELECT → AUDIO  
CAMERA/VTR → VTR STBY  
AUDIO IN CH-1/CH-2 → MIC



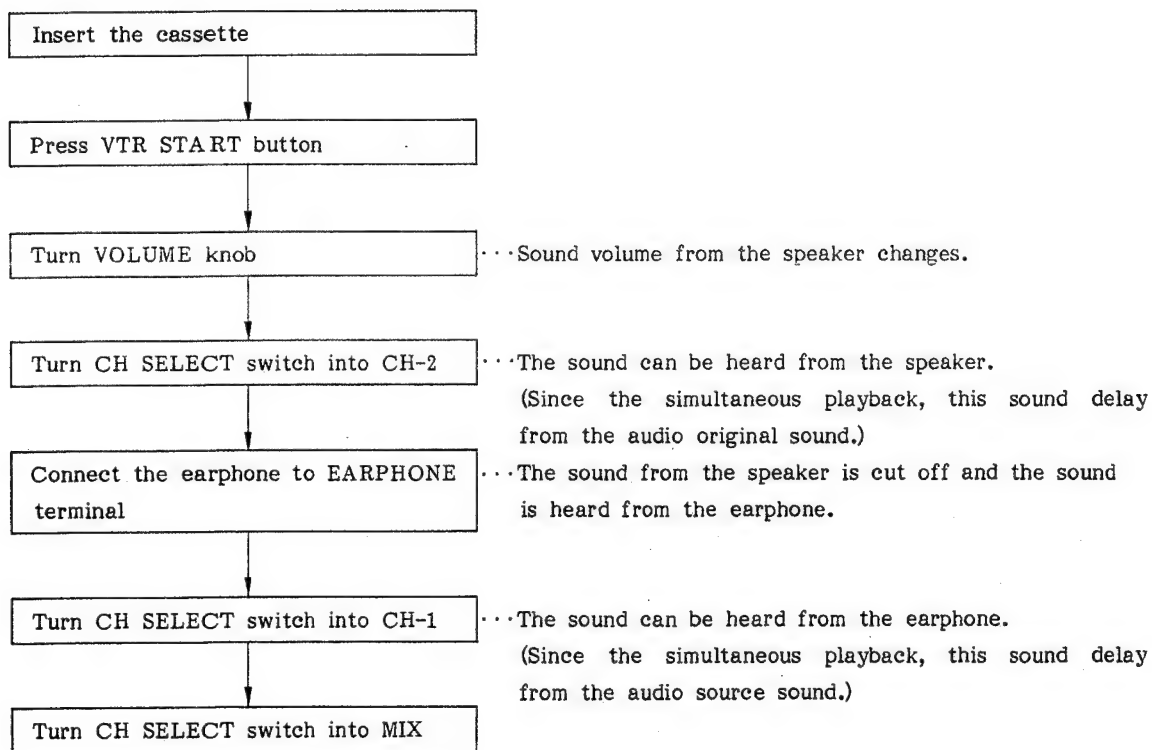
### 3-1-4. Audio Simultaneous Playback Function/Audio Level Check

Equipment : Fully charged battery  
Cassette tape, HG-20  
Earphone

With switches set to : POWER → ON  
AUDIO IN CH-1/CH-2 → CAM  
CAMERA/VTR → STBY  
AUDIO SW → AUTO

#### ACTION

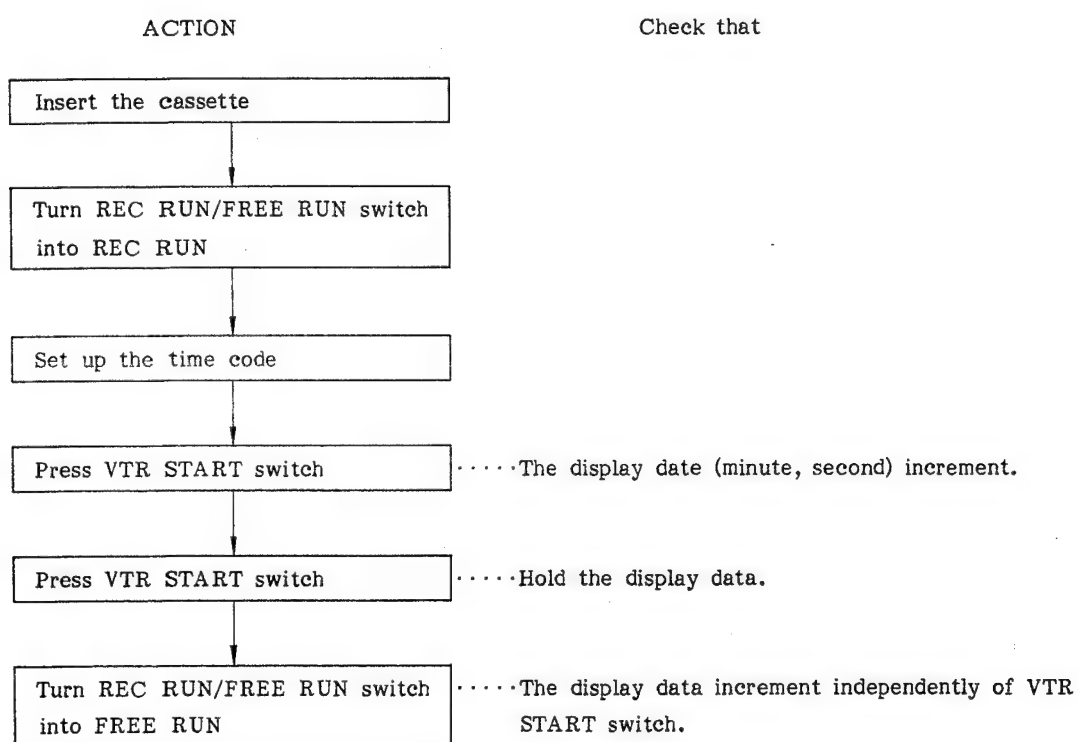
#### Check that



### 3-1-5. Time Code Function Check

Equipment : Fully charged battery  
Cassette tape, HG-20

With switches set to : POWER → ON  
TAPE TIMER/TIME CODE → TIME CODE  
CAMERA/VTR → STBY  
U-BIT/TIME → TIME



### 3-1-6. Record Function Check

In this section, check the recorded tape with VTR is normally recorded or not.

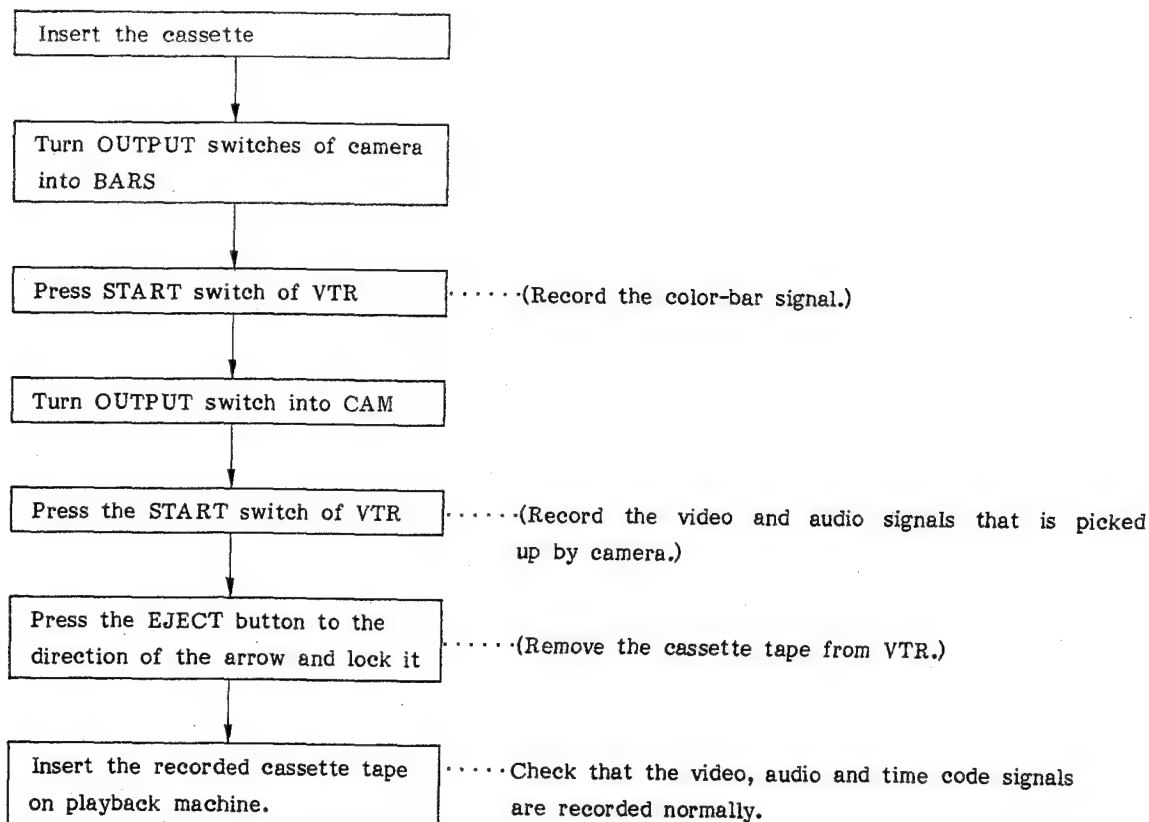
The function of the camera conneted with VTR should be checked already. (Refer to Operation and Maintenance Manual of camera.)

Equipment : Fully charged battery  
Cassette tape, HG-20  
BETACAM system playback machine (The playback function of VTR should be checked before this function check according to the check procedures of Operation and Maintenance Manual)  
Video and audio monitor

With switches set to : POWER → ON  
AUDIO → AUTO  
CAMERA/VTR → VTR STBY  
AUDIO IN CH-1/CH-2 → CAM

ACTION

Check that

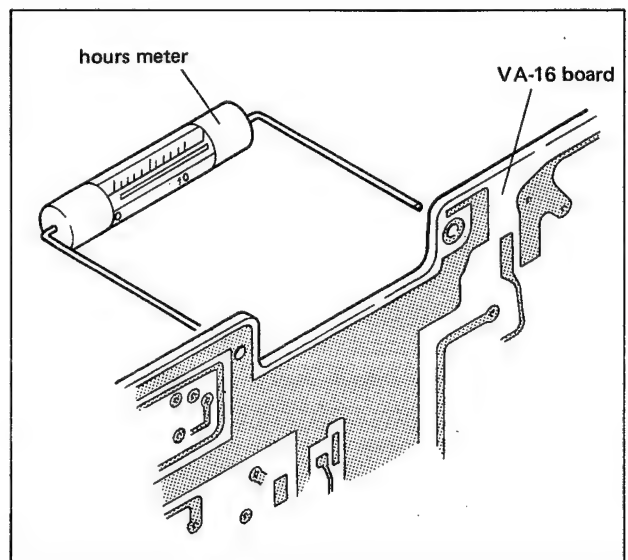


### 3-2. MAINTENANCE

It is recommended that the following periodic check and maintenance schedule be employed in order to obtain maximum performance and longer tape life from the BVV-1A.

#### 3-2-1. Hours Meter

The BVV-1A has an hours meter on the VA-16 board. The hours meter accumulates and records the elapsed time of following modes ; threading, standby (STBY), REC, unthreading, REW and EJECT modes. It is recommended that the hours meter is used as a tool for determining the periodic check. When the hours meter indicates the maximum value, 1000 hours, the hours meter must be replaced with a new one. (Sony parts number ; 1-548-119-00) Replacement procedure ;



### 3-2-2. Maintenance Time Table

○ : Cleaning      ◇ : Check      ◆ : Replacement

Item	Operating Hours (H)	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	Remarks
	Replacement Parts No.									
Cleaning of the tape movement area.	—	○	○	○	○	○	○	○	○	Perform whenever repair work is attempted
Cleaning or replacement of the belts.	See below	○	○	○	◆	○	○	○	◆	
Cleaning or replacement of the pinch roller.	X-3676-031-0	○	○	○	◆	○	○	○	◆	
Cleaning or replacement of the upper drum ass'y.	A-6762-101-A	○	◆	○	◆	○	◆	○	◆	Life of the video heads are effected extensively by operating ambient condition.
Check of the FWD back tension. (Replacement of brake band.)	X-3676-049-0	—	◇	—	◇	—	◆	—	◇	
Check of the T soft brake torque. (Replacement of the T soft brake.)	X-3676-021-0	—	◇	—	◇	—	◆	—	◇	
Check of the S soft brake torque. (Replacement of the S soft brake.)	X-3676-056-0	—	◇	—	◇	—	◇	—	◆	
Check of the T brake torque. (Replacement of the T brake.)	X-3676-022-0	—	◇	—	◇	—	◇	—	◆	
Check of the FWD torque. (Replacement of the FWD idler ass'y.)	X-3676-026-0	◇	◇	◇	◆	◇	◇	◇	◆	
Check of the EJECT torque. (Replacement of the EJECT pulley.)	3-676-163-00	—	◇	—	◆	—	◇	—	◆	
Check of the REW torque. (Replacement of the REW pulley)	X-3676-027-0	—	—	—	—	—	—	—	◆	

\* NOTE: Parts number of belts

FWD belt: 3-676-175-00  
 Drum belt: 3-676-059-00  
 Mechanical belt: 3-676-176-00  
 EJECT belt: 3-676-178-00  
 Threading motor belt: 3-676-303-00

### 3-3. MAINTENANCE AFTER REPAIRS

Perform the following maintenance after repair without regarding the machine operating hours.

1. Video heads and stationary heads cleaning.  
(Referring sec. 3-4)
2. Tape movement area cleaning.  
(Referring sec. 3-4)

### 3-4. CLEANING PROCEDURE

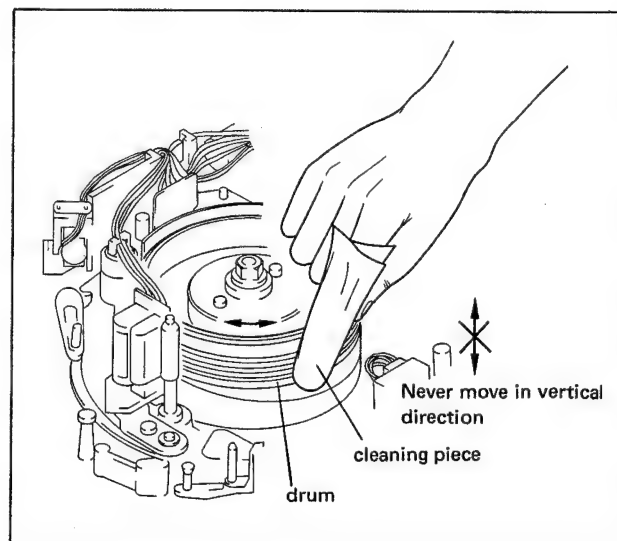
Perform the cleaning as the following procedure.  
After cleaning insert a cassette after the cleaning fluid evaporate completely.

#### 3-4-1. Video Head

Press the cleaning piece moistened with the cleaning fluid and turn the drum slowly with hand.

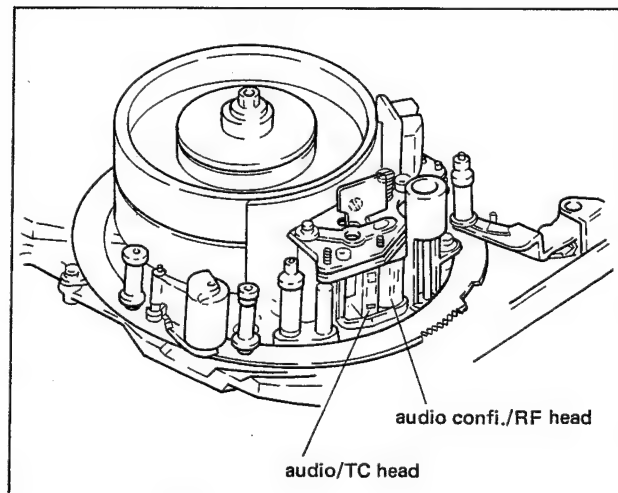
(NOTE) 1 Never move the cleaning piece in the vertical direction of the head tip in the cleaning.

- 2 Perform the cleaning with the power OFF.



#### 3-4-2. Audio/TC, Audio Confi./RF Head

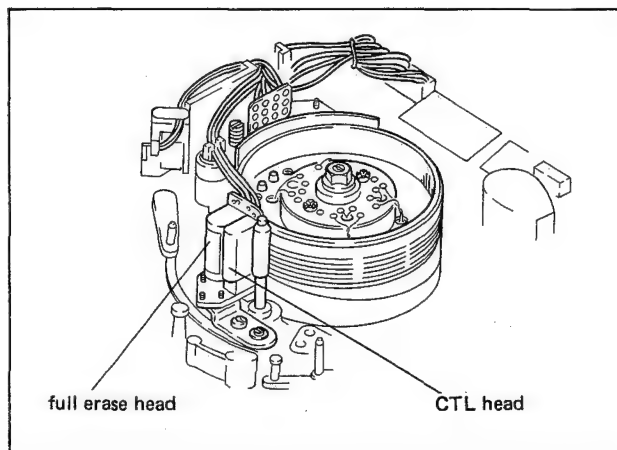
Clean with the cleaning piece moistened with the cleaning fluid.





### 3-4-3. CTL, Erase Head

Clean with the cleaning piece moistened with the cleaning fluid.

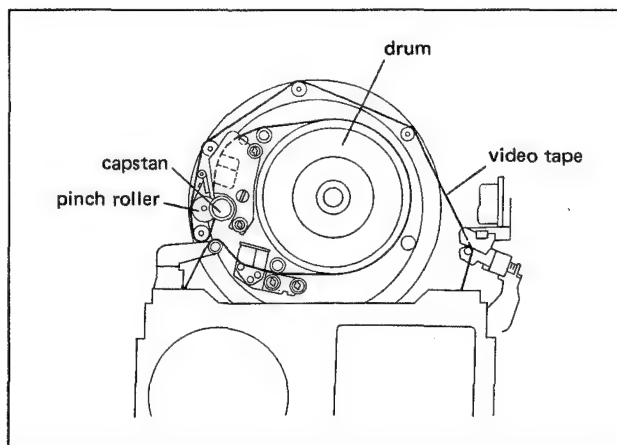


### 3-4-4. Tape Movement Areas

Wipe the tape bearing surface as shown in the following figure (of the tape guides, drum, capstan and the pinch roller) with a piece of cleaning piece moistened with the cleaning fluid.

(NOTE) Do not clean the surface condensation sensor on the lower drum with the cleaning cloth moistened with the cleaning fluid.

Clean the surface with dry cloth.



### 3-5. AFTER USED AT SEASIDE OR DUSTY AREAS

It is recommended to check the follow items after the news gathering at seaside or dusty areas.

- (1) Wipe off sand and other dust in the BVV-1A with a cleaning piece moistened with the cleaning fluid, or blow off with an air-brush carefully.
- (2) Clean the video head and stationary heads with a cleaning piece moistened with the cleaning fluid.
- (3) Clean the tape movement areas (the drum surface, tape guides, capstan shaft and the pinch roller) with a cleaning piece moistened with the cleaning fluid.
- (4) Clean the belts located to both upper and lower of chassis of BVV-1A.
- (5) Clean the surface of the reel tables contacting with the brake shoes.
- (6) Check out any abnormal noise generating or not from the rotating parts such as tape guides, pulley, capstan and the pinch roller, when turns by hand. If noise is generated, replace it with a new one.
- (7) After the news gathering at seaside, remove the printed circuit board (refer sec. 4-3). Clean the printed circuit board with a cleaning piece moistened with the cleaning fluid after blow off sand on the component side with an air-brush completely. Clean the soldering side in the same manners.
- (8) Clean the connector on the connector panel completely. (Disconnect and clean each pins.)
- (9) Perform the operation check and be sure that the machine operates normally.

## SECTION 4 SERVICE INFORMATION

### 4-1. CAMERA BLOCK REMOVAL FROM VTR AND INSTALLING PROCEDURES

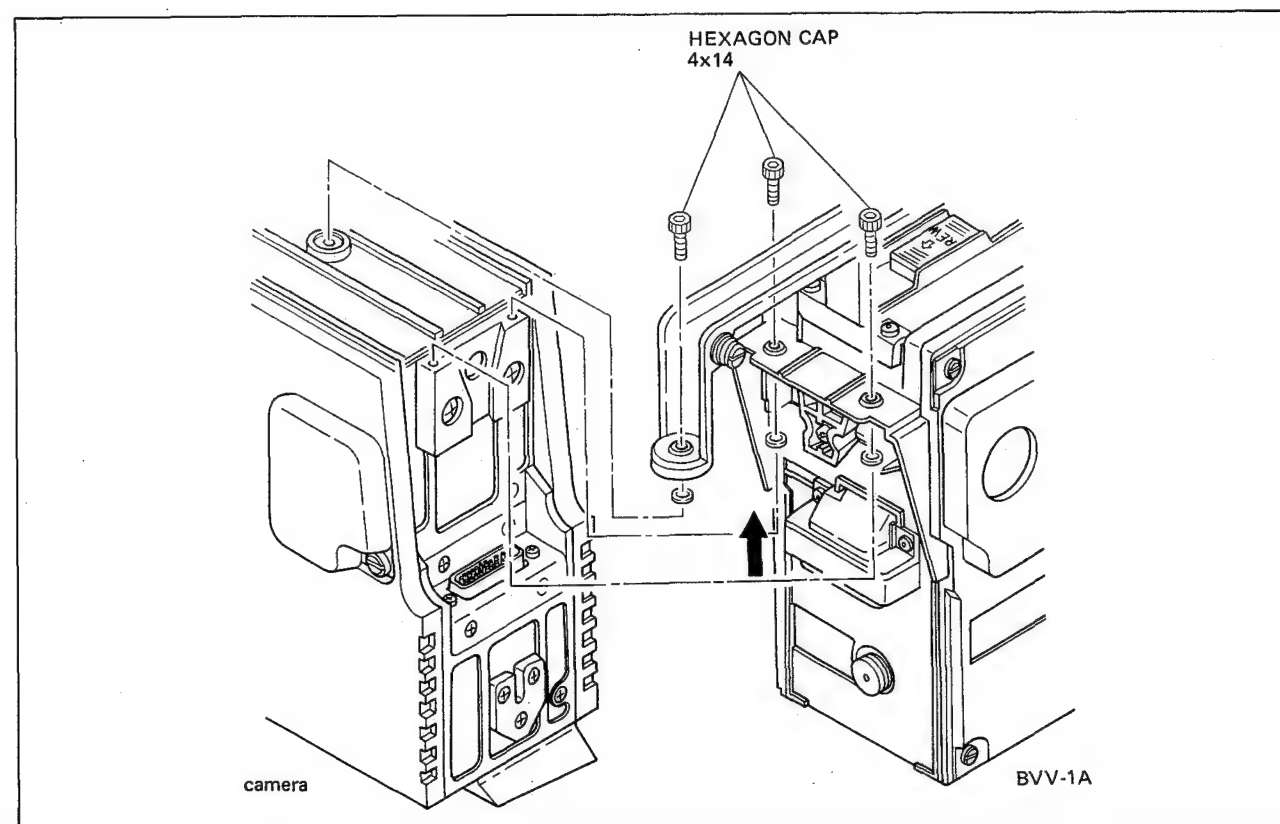
Disassembly and assembly procedures of the camera block and VTR block are follows:

#### 1. Disassembly procedure

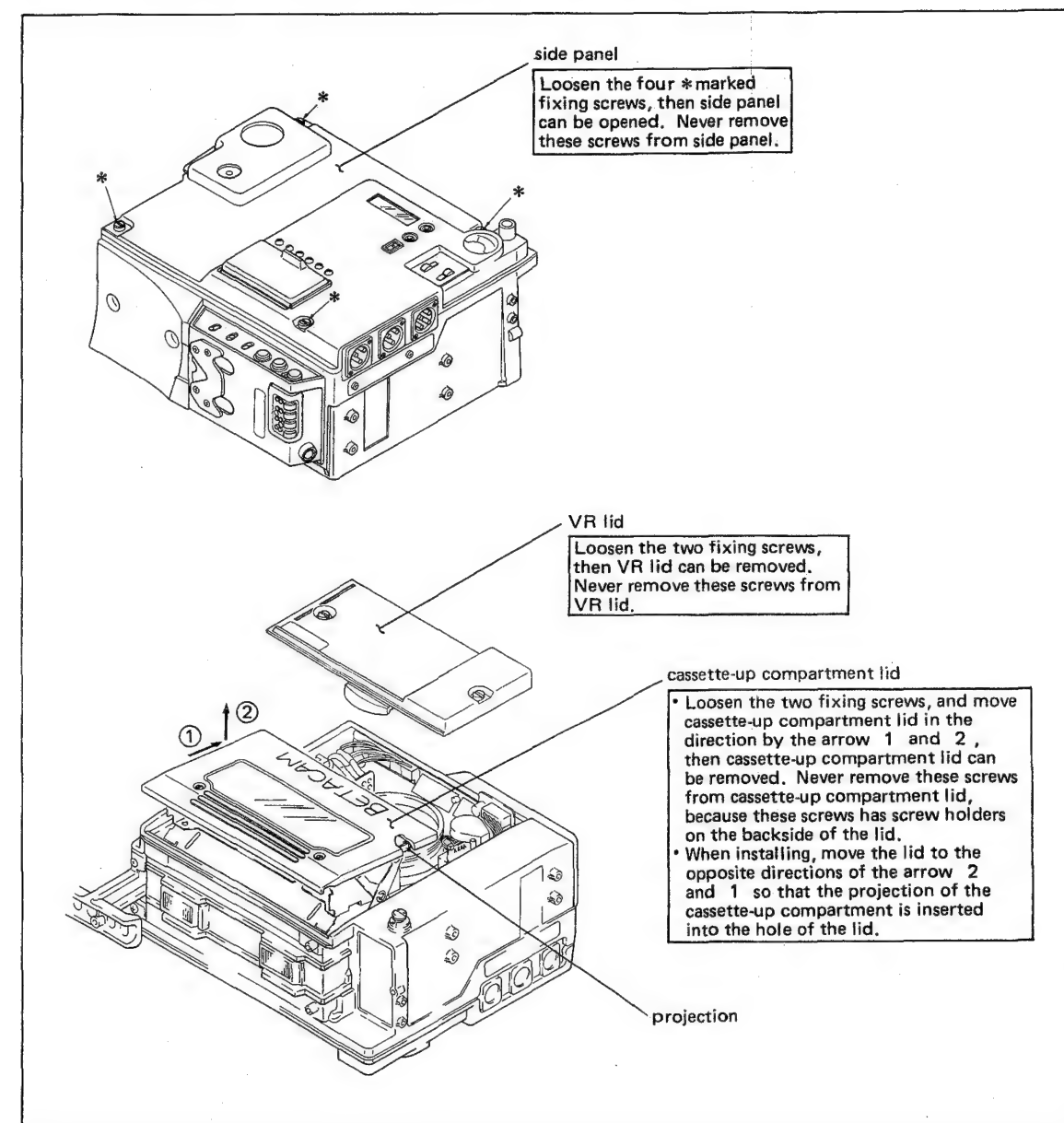
- (i) Remove three fixing screws as shown in figure.
- (ii) Disassemble the VTR by moving in the direction shown by arrow.

#### 2. Assembly procedures

- (i) Assemble the VTR and camera by moving in the opposite directions of what is shown by arrow.  
If the VTR's 50P connector is not inserted into the camera's connector, slightly move the VTR's connector by hand.
- (ii) Tighten three fixing screws.



### 4-2. LEFT AND RIGHT SIDE PANELS REMOVAL PROCEDURES



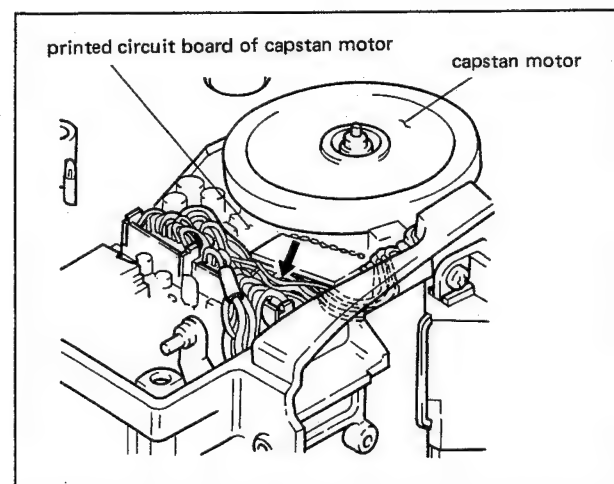
### 4-3. OPENING AND CLOSING PROCEDURES OF PRINTED CIRCUIT BOARDS

#### • VA-16 Board

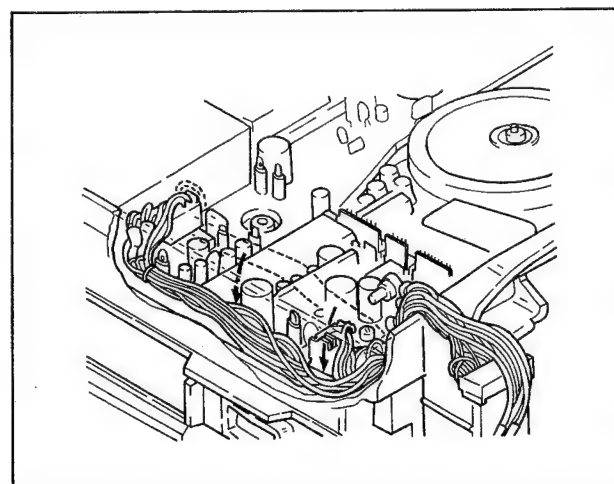
Remove the two fixing screws and then VA-16 board can be opened.

Check the following items when VA-16 board is closed.

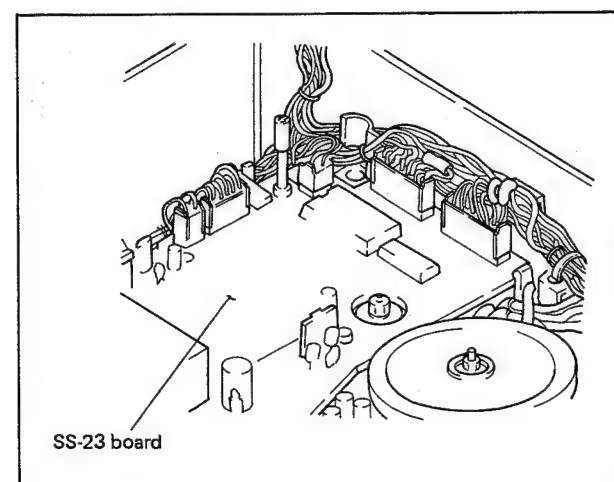
- (i) Check that the connector harness for CN001 and CN112/SS-23 board is inserted between the capstan motor and the connector.



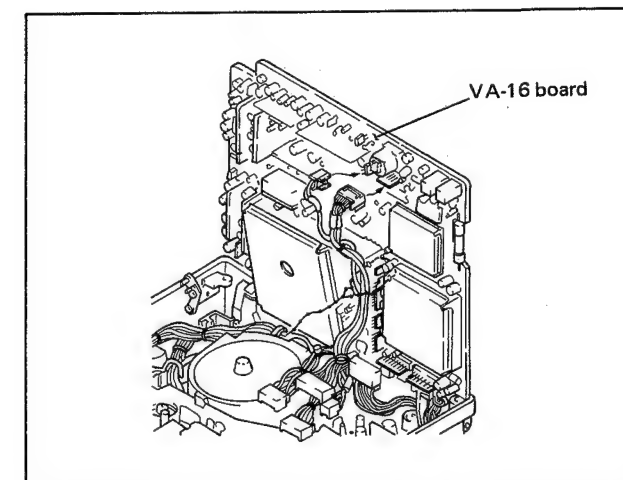
- (ii) Check that the connector harness for CN115/SS-23 board is inserted between the mounted parts and the cabinet.



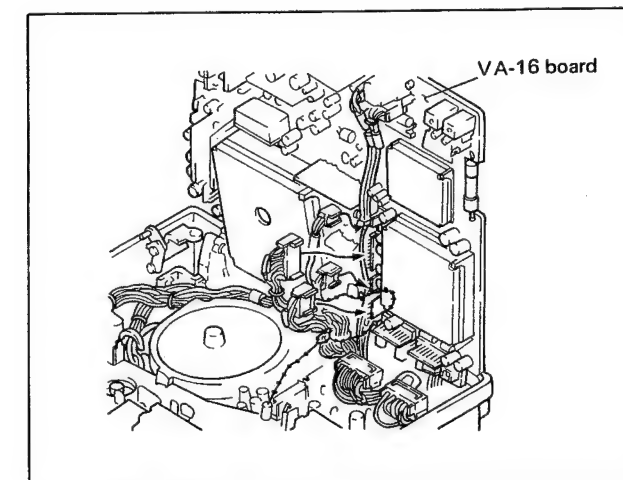
- (iii) Check that the connector harness for CN107 and CN108/SS-23 board between the connector and the cabinet.



- (iv) Check that the connector harness for CN211 and CN210/VA-16 board is banded together with the printed circuit board.

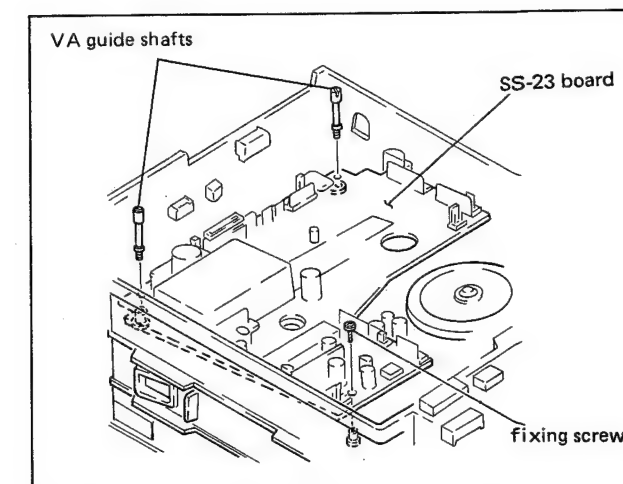


- (v) Check that the connector harness for CN201, 202, 203 and 204/VA-16 board is banded together with the printed circuit board.



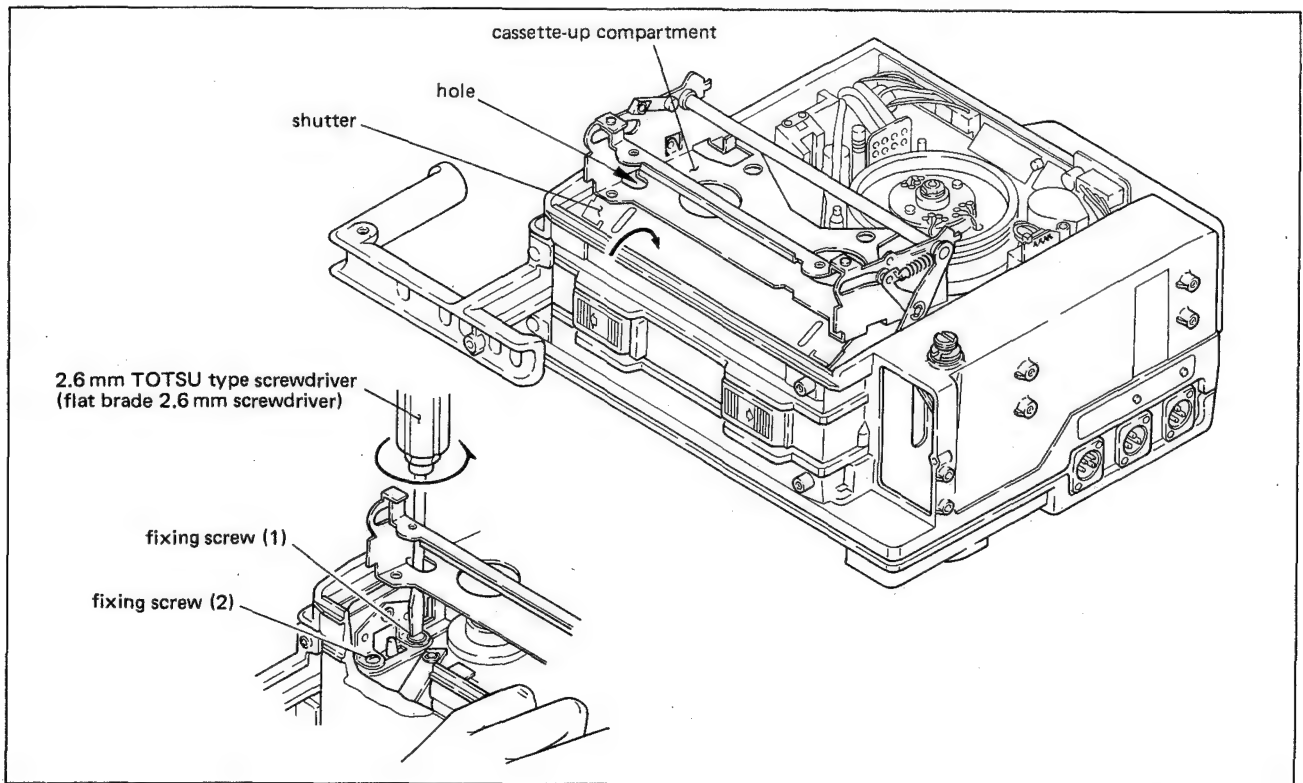
#### • SS-23 Board

Remove the two VA guide shafts and a screw and then SS-23 board is opened.



#### 4-4. CASSETTE-UP COMPARTMENT REMOVAL PROCEDURES

- (1) Remove the cassette-up compartment lid as referring sec. 4-2. Fixing screws will not be detached since it uses a retainer inside the lid.
- (2) Put the cassette-up compartment in the up state by pushing the EJECT button in the direction of the arrow.
- (3) Insert the 2.6mm TOTSU type screwdriver or equivalent into the left side hole of the cassette-up compartment as shown in figure, and loosen the fixing screw (1) as shown in details. Fixing screws will not be detached since it uses a retainer on the cassette-up compartment.
- (4) Push the shutter in the direction of the arrow by finger, and loosen the fixing screw (2) as shown in details.
- (5) Loosen the right side fixing screws in the same manner as the left side. The cassette-up compartment is now removable from the chassis.



#### 4-5. HOW TO PUT THE VTR INTO REC/PB MODE WITHOUT AN EXCLUSIVE CAMERA

The BVV-1A cannot record the video and audio signals without connecting an exclusive camera.

The BVV-1A has not playback circuit. Therefore, in order to put VTR into the REC mode without connecting camera and in order to put VTR into the playback mode for alignment, it is necessary to used the "PB ALIGNMENT CHECKER". For details on the operation of the alignment checker, refer to the instruction manual furnished with it.

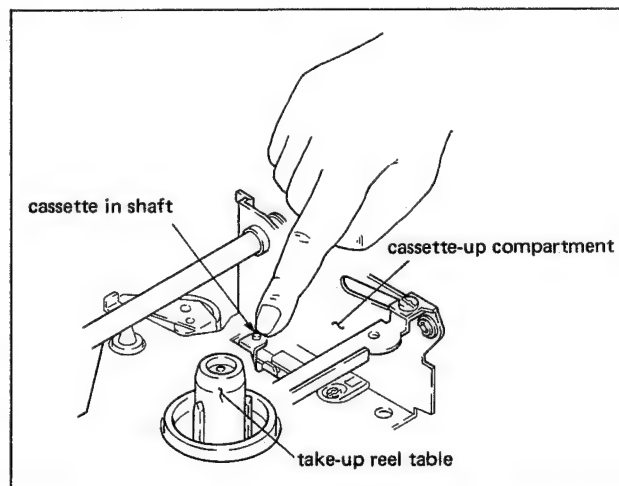
#### 4-6. HOW TO PUT THE VTR INTO THREADING COMPLETION MODE WITHOUT CASSETTE TAPE

In this step, the following procedures are described in the state that the cassette-up compartment is mounted to the set. When the cassette-up compartment is removed from the set, the procedures are the same as described here.

- (1) Remove the cassette-up compartment lid as referring sec. 4-2.
- (2) Turn on the POWER switch.
- (3) When the camera is connected with VTR, turn the CAMERA/VTR switch to STANDBY, when "PB Alignment Checker" is connected with VTR, turn the SAVE switch to STANDBY.
- (4) Push down the cassette-up compartment until locked into position.
- (5) Pressing down the cassette in shaft as shown in figure until the threading ring stops it's rotation.


• How to set up the threading operation:

- (6) When the camera is connected with VTR, turn the CAMERA/VTR switch to SAVE, when the "PB Alignment Checker" is connected with VTR, turn the SAVE switch to SAVE.



#### 4-7. SPARE PARTS

(1) Safety Related Components Warning

Components identified by shading marked with  on the schematic diagrams, exploded views and electrical spare parts list are critical to safe operation. Replace these components with Sony parts whose part numbers appear in this manual or in service bulletins and service manual supplements published by Sony.

(2) Replacement parts supplied from Sony Parts Center will sometimes have a different shape from the original parts. This is due to "accommodating the improved parts and/or engineering changes" or "standardization of genuine parts".

This manual's exploded views and electrical spare parts list indicate the parts numbers of "the standardized genuine parts at present". Regarding engineering parts changes in our engineering department, refer to Sony service bulletins and service manual supplements.

(3) The parts as shown "S" in SP space on the exploded views and electrical spare parts list are normally stocked for replacement purposes. The parts as shown "O" in SP space are not normally required for routine service work. Orders for parts as shown "O" will be processed, but allow for additional delivery time.

#### 4-8. CHIP PARTS REPLACEMENT PROCEDURE

BVV-1A uses chip parts such as carbon resistor, ceramic capacitor, transistor and diode in some circuits. It also uses IC's of flat-pack type.

As the appearance of carbon resistor and ceramic capacitor are identical, distinguishing of each can be possible by visual check of reference address of silk-screen print on the printed circuit board.

As the shape of transistor and diode are same, they also are distinguished by the reference address of silk-screen print.

**Tools:**

Soldering iron : 20W

(If possible, use soldering tip heat-controller of  $270^{\circ} \pm 10^{\circ} \text{C}$ )

Desoldering metal braid ("SOLDER TAUL" or equivalent)

Solder (of 0.6mm dia. is recommended.)

Tweezers

**Soldering Conditions:**

Tip temperature;  $270^{\circ} \pm 10^{\circ} \text{C}$

Solder within 2 sec. per an electrode

**(1) Resistor and capacitor**

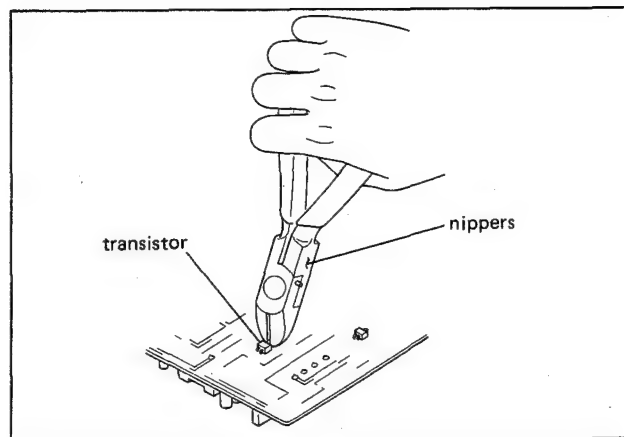
- (i) Add heat onto the chip-part by the top of soldering iron tip and slide the chip-part aside when the solder is melted.
- (ii) Confirm visually with care that there is no pattern peeling, damage, and/or bridge where the part was removed or its surrounding.
- (iii) Presolder the pattern into thin where the part was removed.
- (iv) Place a new chip-part onto the pattern and solder both sides.

**(CAUTION)**

Do not use the chip-part again once used.

**(2) Transistor and diode**

- (i) Cut the leads of the semiconductor part to be removed with nippers.
- (ii) Remove the leads cut as the above, and confirm visually that there is no pattern peeling, any damage and/or bridge where the part was removed or its surrounding.
- (iii) Presolder the pattern into thin where the part was removed.
- (iv) Place a new chip-part onto the pattern and solder the leads.





(3) IC

- (i) Unsolder the pins of IC with desoldering metal braid.
- (ii) Remove the each pin of IC from the pattern by tweezers while heating the pin by soldering iron.
- (iii) Confirm visually with care that there is no pattern peeling, damage, and/or bridge where the part was removed or its surrounding.
- (iv) Place a new IC onto the pattern and solder it.

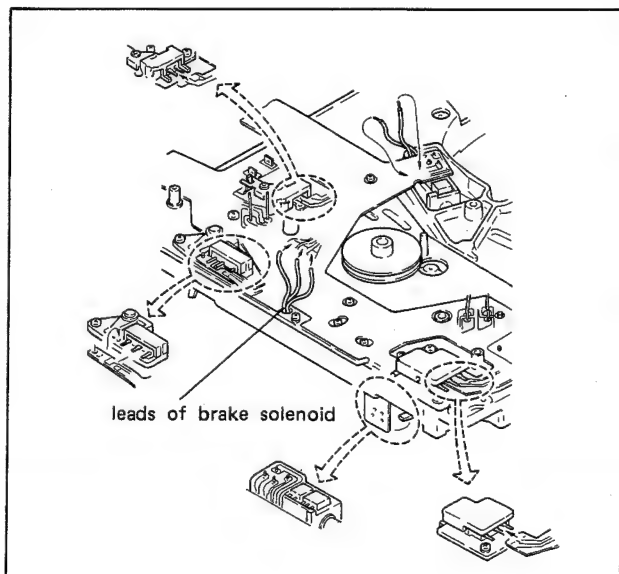
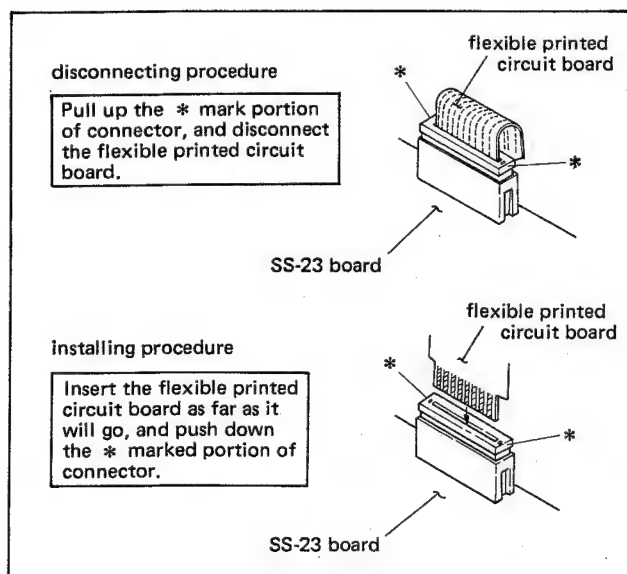
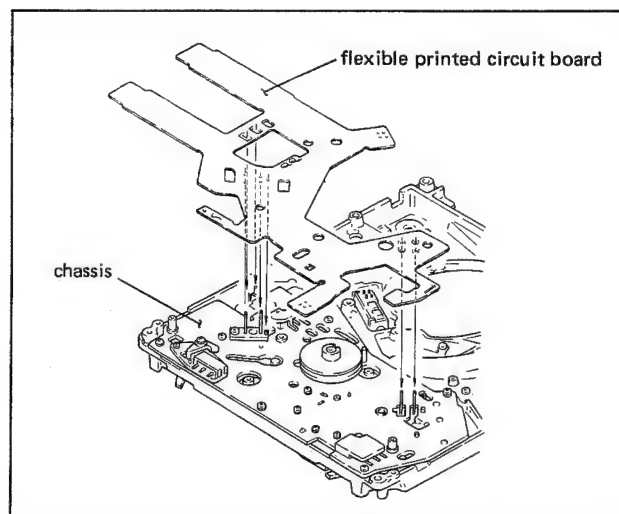
**(CAUTION)**

Do not use the chip-part again once used.

**4-9. FLEXIBLE PRINTED CIRCUIT BOARD**

The flexible printed circuit board is placed between the mechanical chassis and SS-23 board. This flexible printed circuit board is used for the terminal board of the micro switches, photo-interrupter and so on. Extremely take care to handle the flexible printed circuit board for particularly following items.

- Solder the terminals, using a less than 30W soldering iron.
- The installing and removing procedures of the flexible printed circuit board's connector on SS-23 board are shown in figure.

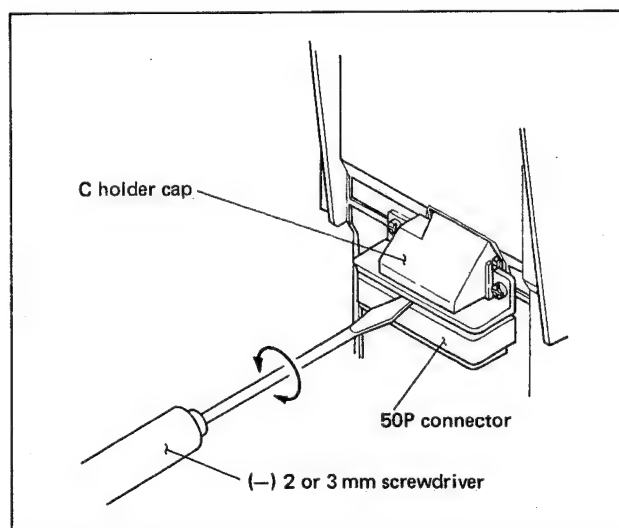


#### 4-10. 50P "VTR AND CAMERA" CONNECTING CONNECTOR

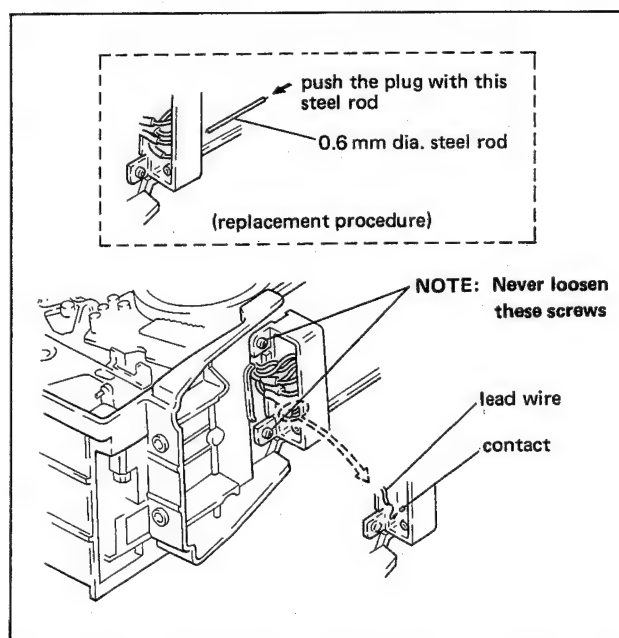
The position of the 50P connector on the VTR is factory calibrated precisely with special tool.

If this position is incorrect, the VTR connector cannot be inserted into the camera connector or do not make positive contact with the camera connector. Therefore do not remove the V connector holder and 50P connector by removing the fixing screws as shown in figure, except special case.

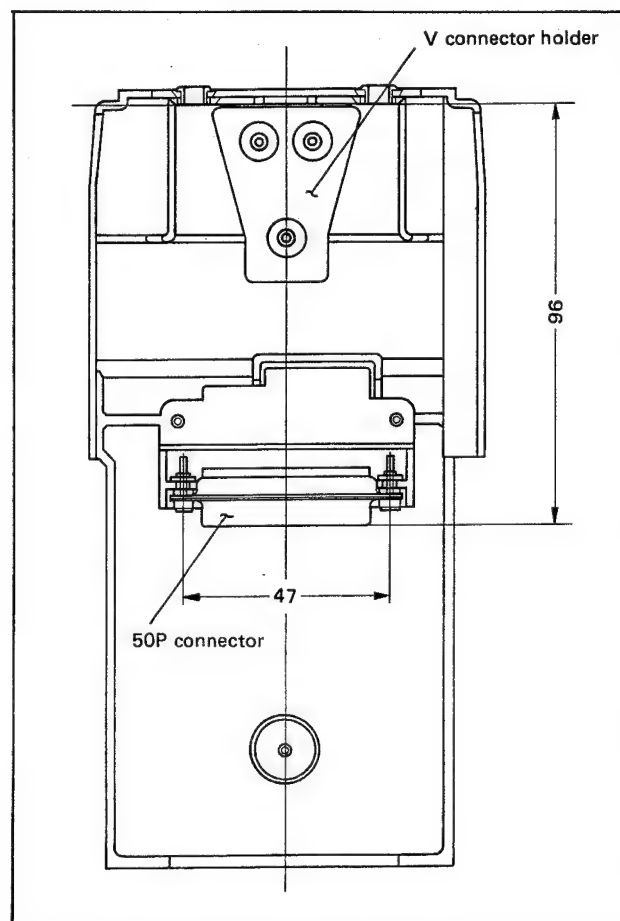
- When you check the 50P connector portion, remove the C holder cap as shown in figure.



- If the lead wire is happened to be open at the 50P connector portion, solder the lead wire with contact.
- If the connector indicates a poor contact with the plug, remove the contact as shown in figure and replace it with a new one.



- If the V connector holder and 50P connector are removed, install these parts until it meets the specified value by using a rule. After installation, check that the connection of the VTR and camera is firmly connected.



#### 4-11. CASSETTE TAPE REMOVAL PROCEDURE WHEN TAPE SLACK IS ACTIVATED

Tape slack is detected with the reel rotation detector beneath the take-up reel table. If the take-up reel table is stopped its rotation more than about 0.25sec. by any reason in the REC mode, the machine detects as the tape slacks in the machine. The machine stops all mode to avoid tape damage. If the take-up reel table is stopped its rotation more than about 0.3sec. by any reason in the EJECT mode, the machine detects as the tape slacks in the machine same as in REC mode. The machine stops all mode.

In this case, the cassette tape can be removed from the machine by the following procedures. Locate the cause of the trouble and remedy the problem.

- When the tape slack is detected in use of external power supply.

- (1) Turn off the POWER on the external power supply.
- (2) Remove the VR lid.
- (3) Turn on the POWER once on the external power supply. Check as soon as possible that the threading ring rotates in the unthreading direction (clockwise direction) and the tape is taken up to the take-up reel table at the same time. If it is not to meet the both conditions, turn off the POWER quickly.

- When the threading ring does not rotate in the unthreading direction, perform steps (4) and following steps.

- When the threading ring rotates in the unthreading direction but the tape is not taken up to the take-up reel table, perform steps (8) and following steps.

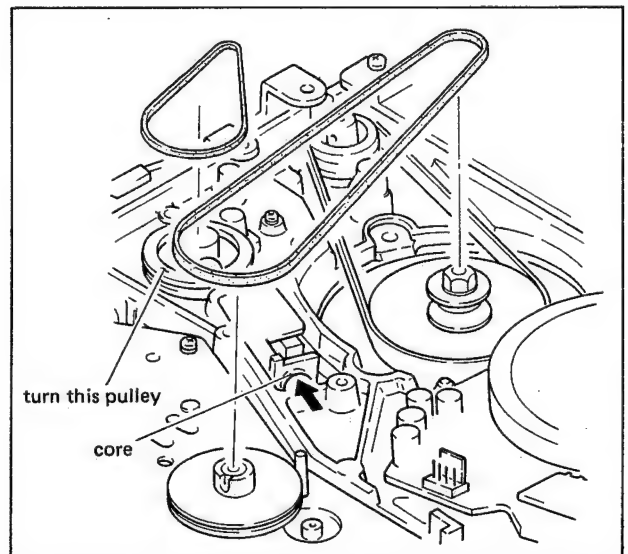
- When the tape slack is detected in use of internal battery.

- (1) Remove the VR lid.
- (2) Remove the battery lid.

- (3) Reinsert the battery after disconnect the internal battery. At this time, check as soon as possible that the threading ring rotates in the unthreading direction (clockwise direction) and the tape is taken-up to the take-up reel table at the same time. If it is not to meet the both conditions, disconnect the internal battery quickly.
- . When the threading ring does not rotate in the unthreading direction, perform steps (4) and following steps.
  - . When the threading ring rotates in the unthreading direction but the tape is not taken up to the take-up reel table, perform steps (8) and following steps.

• Tape Removal Procedure

- (4) Open the side panel, and open the VA-16 and SS-23 boards (refer to sec. 4-2, 4-3).
- (5) Remove the two belts as shown in figure.
- (6) While pushing the core of the solenoid in the direction of the arrow as shown in figure, turn the pulley three or four turns in the clockwise direction viewing from back side of the machine.
- (7) Release the finger from the core, and turn the pulley in the clockwise direction until the threading ring comes in the fully unthreading position.
- (8) While holding down the cassette-up compartment lid by hand, move the EJECT button to **maximum 10mm distance** in the direction of the arrow, and return the EJECT button to the original position.
- Check that the supply reel table rotates and takes-up the tape remaining in the machine.



**(CAUTION)**

When you push the EJECT button as far as it will go in the direction of the arrow, EJECT button is locked and cassette-up compartment has risen up. But the tape is remaining in the machine so the tape is damaged. Therefore take care that the EJECT button is not locked in this step. If the EJECT button is locked, hold the cassette tape lid so that it does not close, and rise up the cassette-up compartment slowly by releasing the holding hand of the cassette-up compartment. Remove the tape remaining in the machine carefully so that it does not damage.

- (9) Repeat step (8) until the remaining tape is taken up to the supply reel table.
- (10) Push and lock the EJECT button as far as it will go in the direction of the arrow, and remove the tape from the cassette-up compartment.

**(NOTE)**

- (1) When the threading ring does not rotate in the unthreading direction, it seems that the cause of this trouble is power supply system.
- (2) When the threading ring rotates in the unthreading direction but the tape is not taken up to the take-up reel table, it seems that the cause of this trouble is EJECT belt cutting, take-up reel shaft burning, or malfunction of brake or FWD solenoid.

#### 4-12. ALIGNMENT FIXTURE

Part Number	Description	For Use
J-6001-820-A	Drum Eccentricity Gauge (3)	Upper drum eccentricity adjustment
J-6001-830-A	Drum Eccentricity Gauge (2)	
J-6001-840-A	Drum Eccentricity Gauge (1)	
J-6087-000-A	Drum Eccentricity Gauge (5)	
J-6080-008-A	Cassette Reference Plate	Reel table adjustment
J-6080-011-A	Reel Table Tension Gauge	REW torque measurement
J-6080-013-A	Dihedral Adjustment Screw	Video head dihedral adjustment
J-6086-570-A	Flatness Plate	Audio/TC head zenith adjustment
J-6190-800-A	Tension Regulator Slantness Check Tool	Tension regulator slantness adjustment
J-6195-360-A	BVV-1 PB Alignment Checker	Video tracking and stationary heads position adjustments
Y-2031-001-0	Cleaning Fluid	Cleaning
2-034-697-00	Cleaning Piece	
3-702-390-01	Eccentricity Driver (4mm dia.)	TC head position adjustment
7-732-050-10	Tension Scale (20g full scale)	Torque and back tension adjustment
7-732-050-20	Tension Scale (50g full scale)	
7-732-050-30	Tension Scale (100g full scale)	
7-732-050-40	Tension Scale (200g full scale)	
7-732-050-50	Tension Scale (500g full scale)	
7-723-902-00	Inspection Mirror	Video tracking adjustment
8-960-097-02	Alignment Tape, CR2-1	Video tracking tape for player
8-960-097-03	Alignment Tape, CR2-3	Video tracking tape for recorder
8-960-097-37	Alignment Tape, CR5-1A	Video, audio and servo alignments for recorder and player
9-911-053-00	Thickness Gauge	Clearance check
Standard Products	Head Demagnetizer (HE-4)	Head demagnetize





## SECTION 5

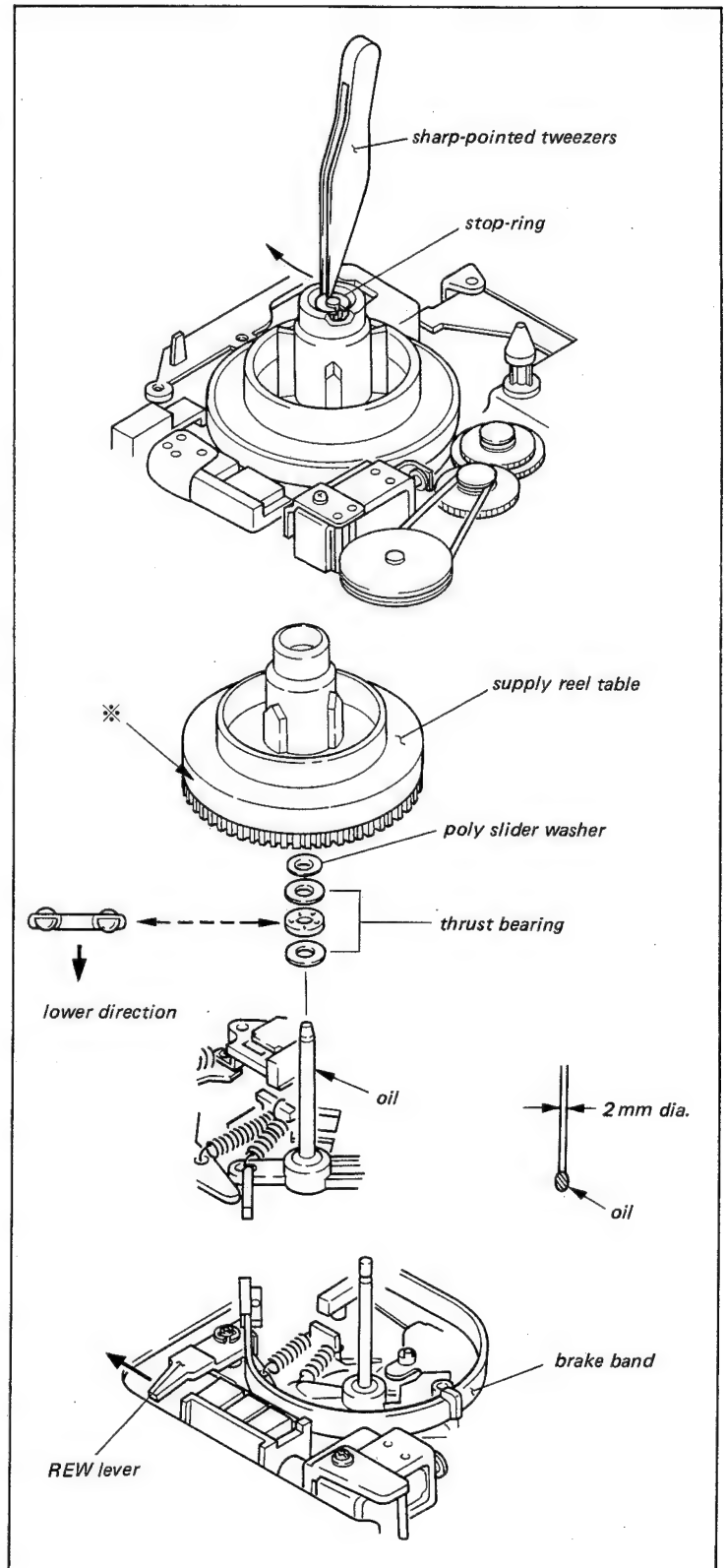
### REPLACEMENT OF MAJOR PARTS

#### 5-1. REPLACEMENT OF SUPPLY REEL TABLE

**Mode:** Unthreading end

**Replacement procedure:**

- (1) Remove the stop-ring on top of the reel table with a sharp-pointed tweezers as shown in figure.
- (2) Remove the reel table. Check that the thrust bearing and poly slider washer have remained on the reel shaft. When they are removed with reel table, install them on the reel shaft as shown in figure.
- (3) Clean the reel shaft with a cloth moistened with cleaning fluid.
- (4) Apply a drop of sony oil on the reel shaft as shown in figure. Amount of oil should be one drop that is scooped by tip of 2mm diameter twig such as pencil lead.
- (5) Clean the \* marked portion of the reel table with a cloth moistened with cleaning fluid.
- (6) While pressing the REW lever to the arrow direction, install the reel table on the reel shaft. Be careful not to damage the brake band.
- (7) Perform the sec. 6-1 Reel Table Height Adjustment. After adjustment, install the stop ring on the upper portion of the reel table.
- (8) Perform the adjustment as sec. 5-21.

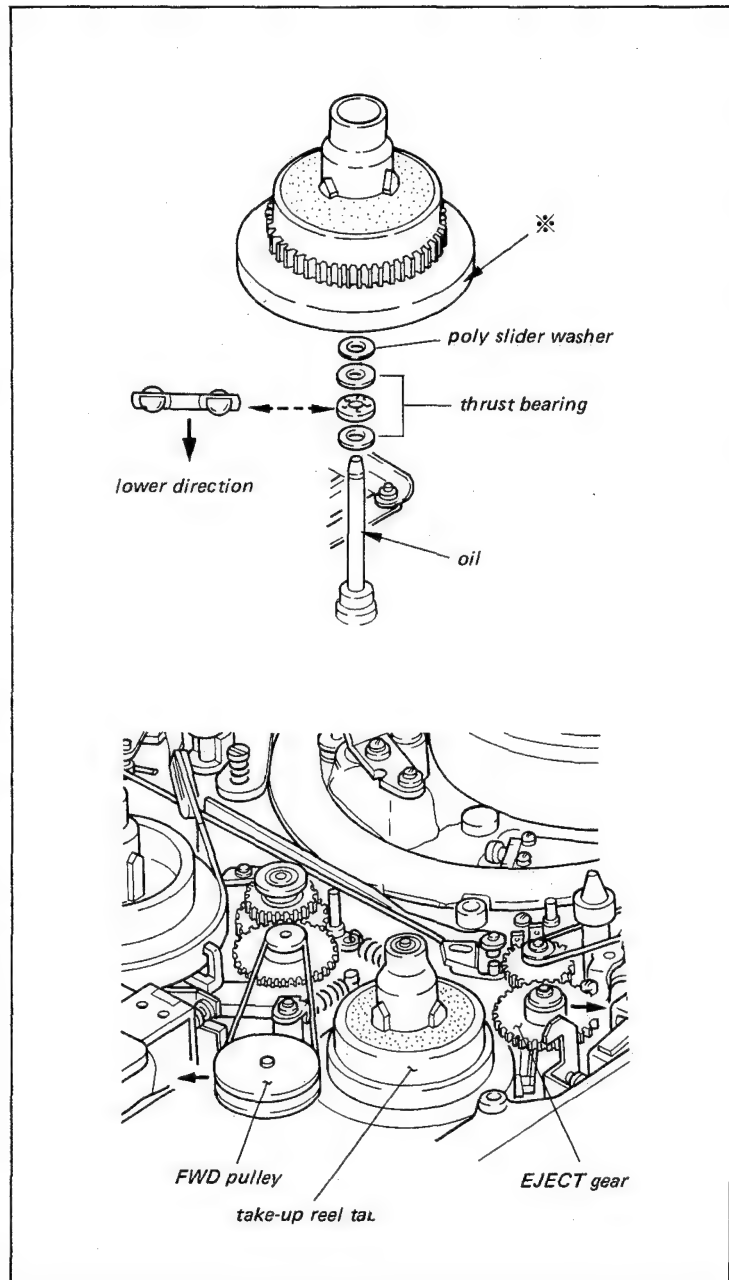


## 5-2. REPLACEMENT OF TAKE-UP REEL TABLE

**Mode:** Unthreading end

**Replacement procedure:**

- (1) Remove the stop-ring on top of the reel table with a sharp-pointed tweezers.
- (2) Remove the reel table while pressing the EJECT gear and the FWD pulley in the direction of the arrow. Check that the thrust bearing and poly slider washer have remained on the reel shaft. When they are removed with the reel table, install them on the reel shaft as shown in figure.
- (3) Clean the reel shaft with a cloth moistened with cleaning fluid.
- (4) Apply a drop of sony oil on the reel shaft as shown in figure.
- (5) Clean the \* marked portion of the reel table with a cloth moistened with cleaning fluid.
- (6) While cancelling the two brakes and pushing the EJECT gear and FWD pulley in the direction of the arrows, install the reel table on the reel shaft.
- (7) Perform the sec.6-1 reel table height adjustment. After adjustment, install the stop ring on the upper portion of the reel table.
- (8) Perform the adjustments as sec.5-21.



### 5-3. REPLACEMENT OF SUPPLY REEL TABLE ROTATION DETECTOR

. Since the LED for the rotation detector and the photo-transistor are pasted with a locking compound to the interrupter holder, replace the following three parts simultaneously.

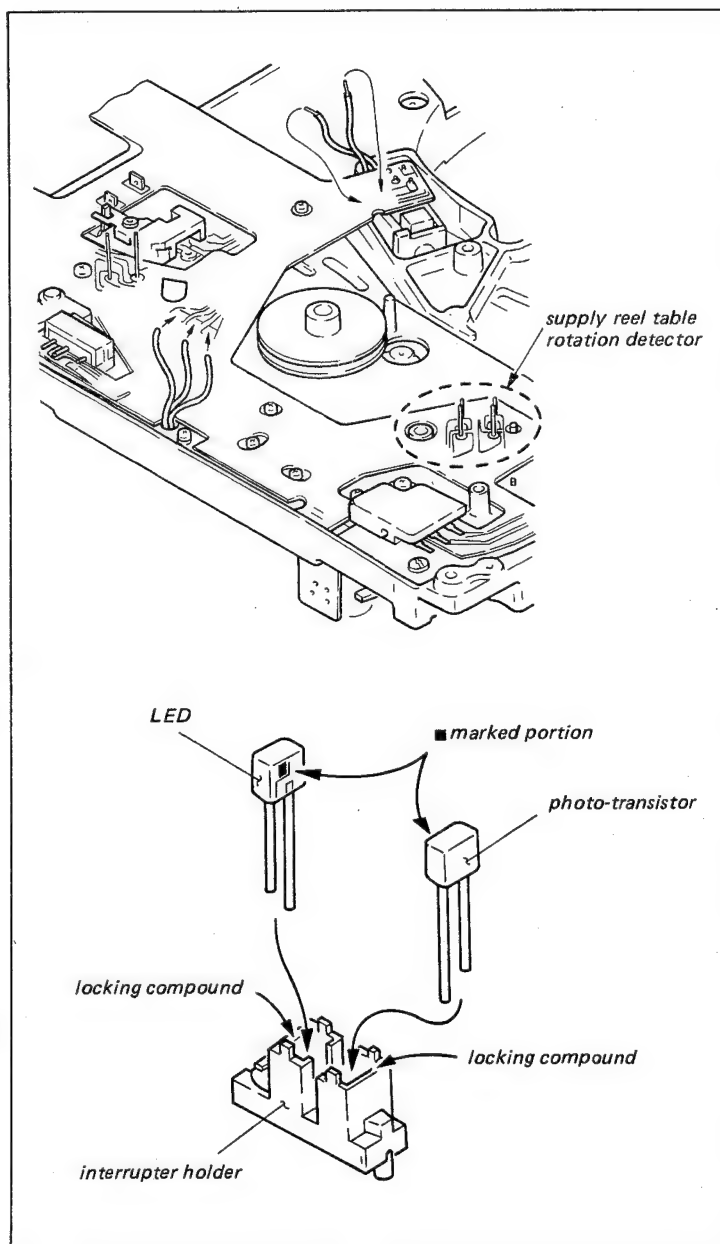
8-719-103-15 : LED

8-729-101-13 : Photo-transistor

3-676-258-00 : Interrupter holder

#### Replacement procedure:

- (1) Open the VA-16 and the SS-23 boards.
- (2) Unsolder the terminals of the LED and the photo-transistor from the FL board.
- (3) Remove the supply reel table. Check that the thrust bearing and poly slider washer have remained on the reel shaft. When they are removed with the reel table, install them on the reel shaft as shown in figure (see sec. 5-1).
- (4) Remove the interrupter holder.
- (5) Insert the LED on the interrupter holder so that the ■ marked portion of the LED is closest to the photo-transistor location.  
The installing position is as shown in figure.
- (6) Insert the photo-transistor on the interrupter holder so that the ■ marked portion of the photo-transistor is closest to the LED location.
- (7) press the LED and the photo-transistor to the interrupter holder and paste with a locking compound at the position as shown in figure.
- (8) Install the interrupter holder.
- (9) Solder the terminals on the FL board.
- (10) Install the supply reel table referring sec. 6-1.



#### 5-4. REPLACEMENT OF TAKE-UP REEL TABLE ROTATION DETECTOR

. Since the LED for the rotation detector and the photo-transistor are pasted with a locking compound to the interrupter holder, replace the following three parts simultaneously.

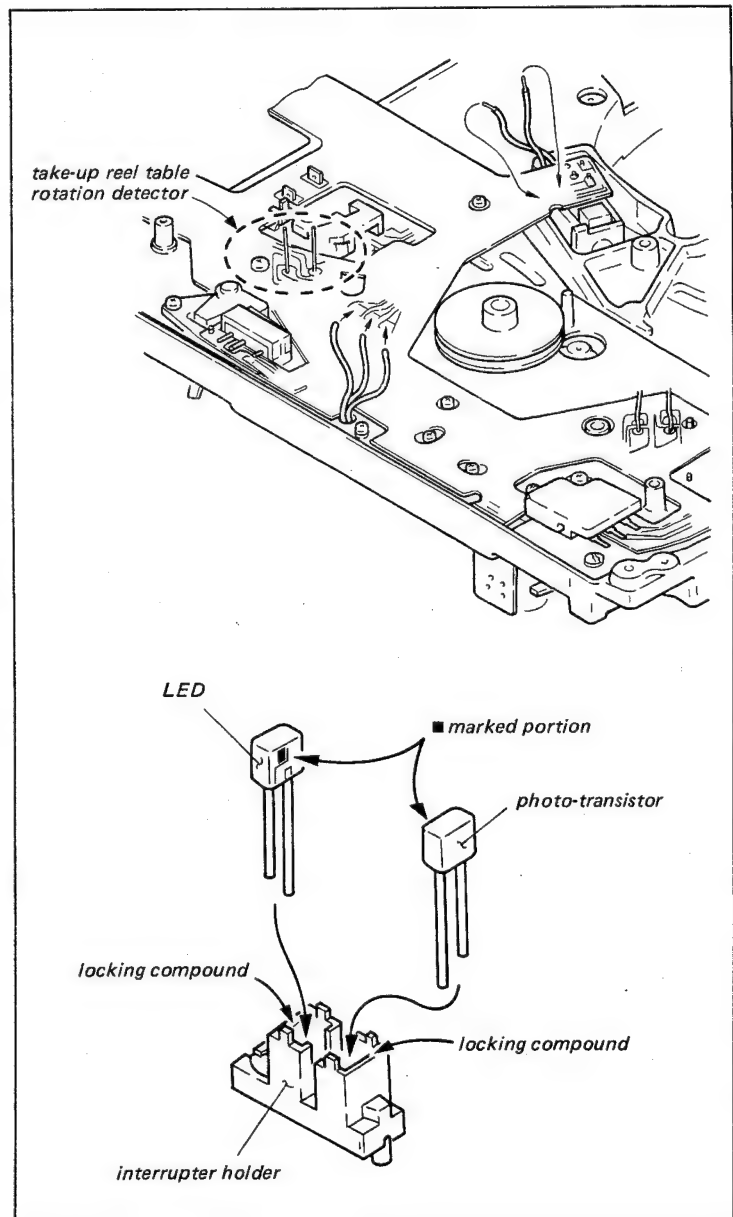
8-719-103-15 : LED

8-729-101-13 : Photo-transistor

3-676-258-00 : Interrupter holder

##### Replacement procedure:

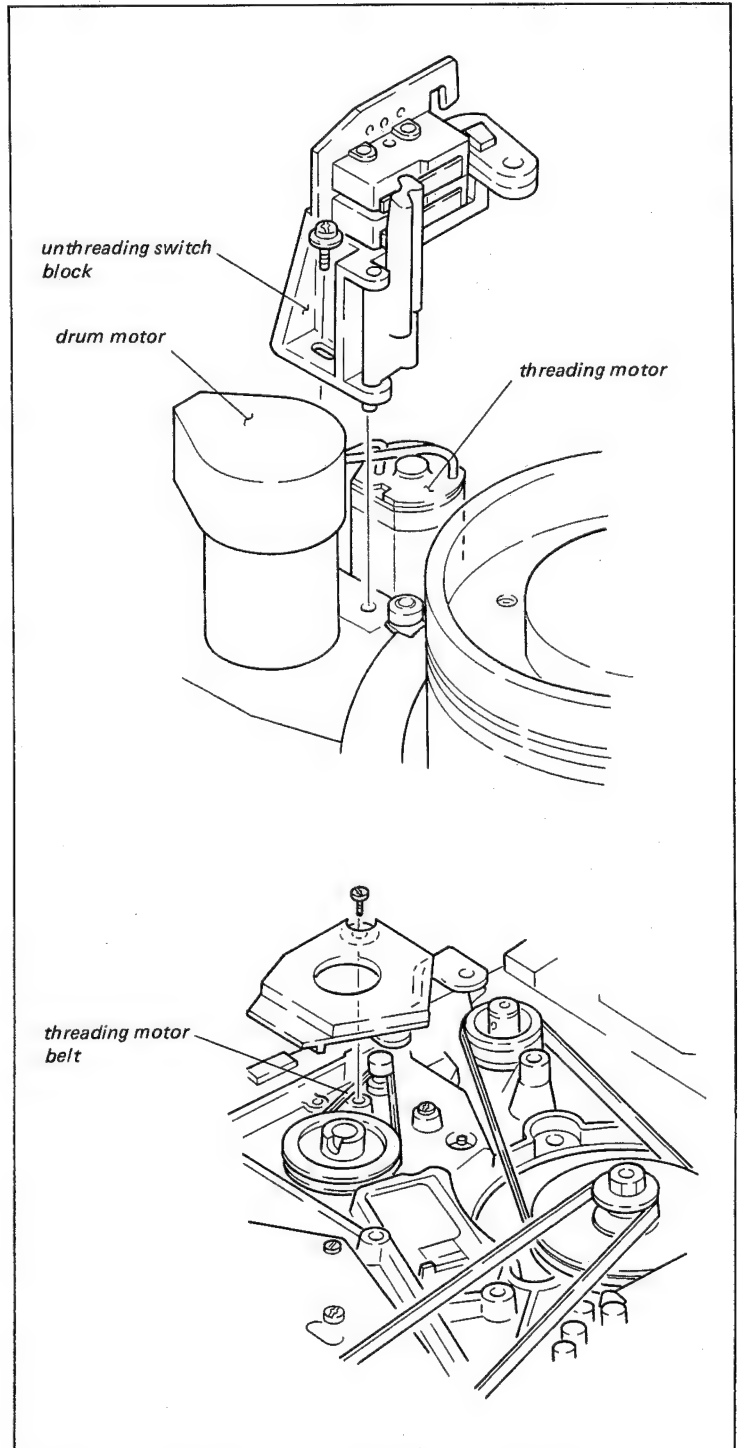
- (1) Open the VA-16 and the SS-23 boards.
- (2) Unsolder the terminals of the LED and the photo-transistor from the FL board.
- (3) Remove the mounting screw of the interrupter holder on the back of the chassis.
- (4) Lift up the FL board lightly, remove the interrupter holder.
- (5) Insert the LED on the interrupter holder so that the ■ marked portion of the LED is closest to the photo-transistor location.  
The installing position is as shown in figure.
- (6) Insert the photo-transistor on the interrupter holder so that the ■ marked portion is closest to the LED location.
- (7) Press the LED and the phototransistor to the interrupter holder and paste with a locking compound at the position as shown in figure.
- (8) Install the interrupter holder.
- (9) Solder the terminals on the FL board.



## 5-5. REPLACEMENT OF THREADING MOTOR

### Replacement procedure:

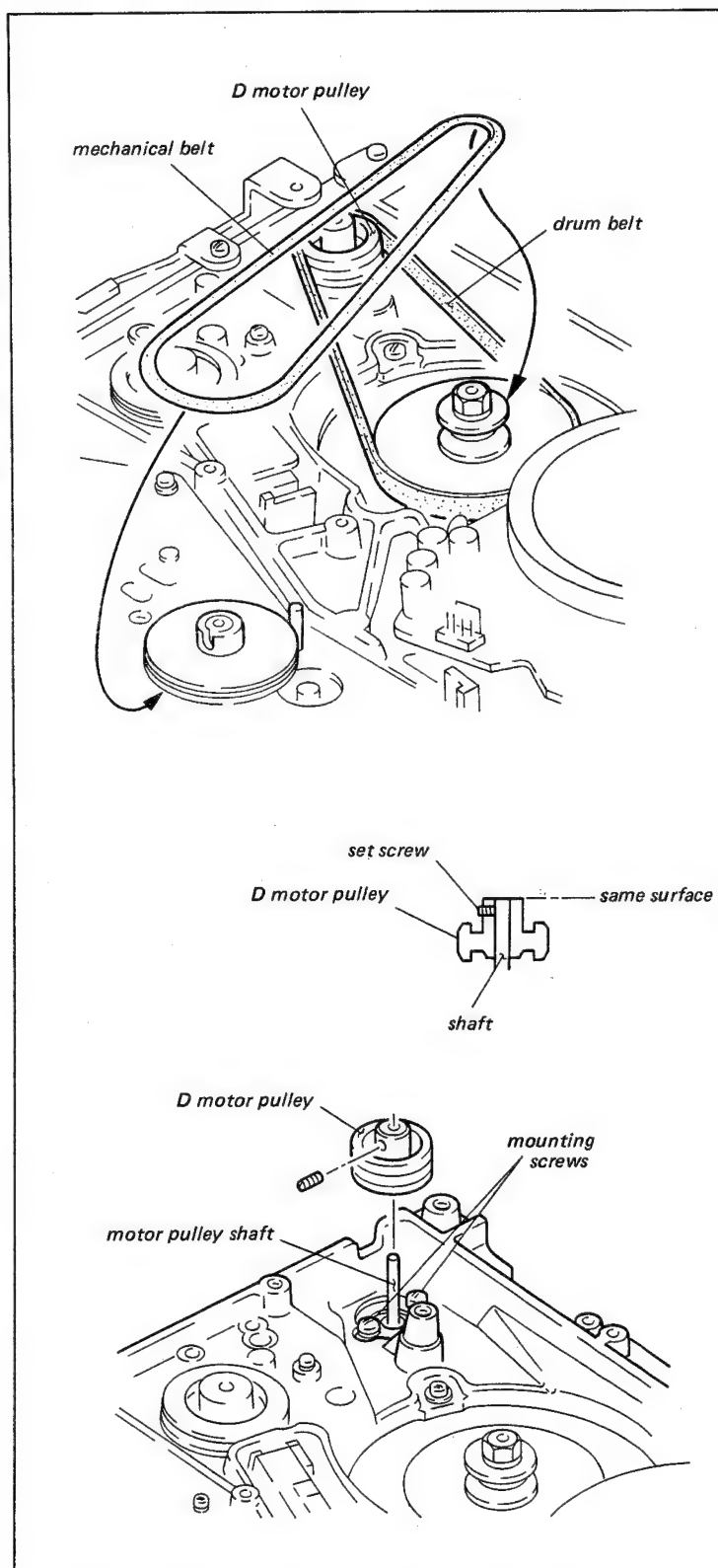
- (1) Disconnect the threading motor connector, CN308 from the TR board.
- (2) Remove the unthreading switch block.
- (3) Open the VA-16 and the SS-23 boards.
- (4) Remove the threading motor belt.
- (5) Replace the threading motor with the new one.
- (6) Reassemble by reversing steps.



## 5-6. REPLACEMENT OF DRUM MOTOR

### Replacement procedure:

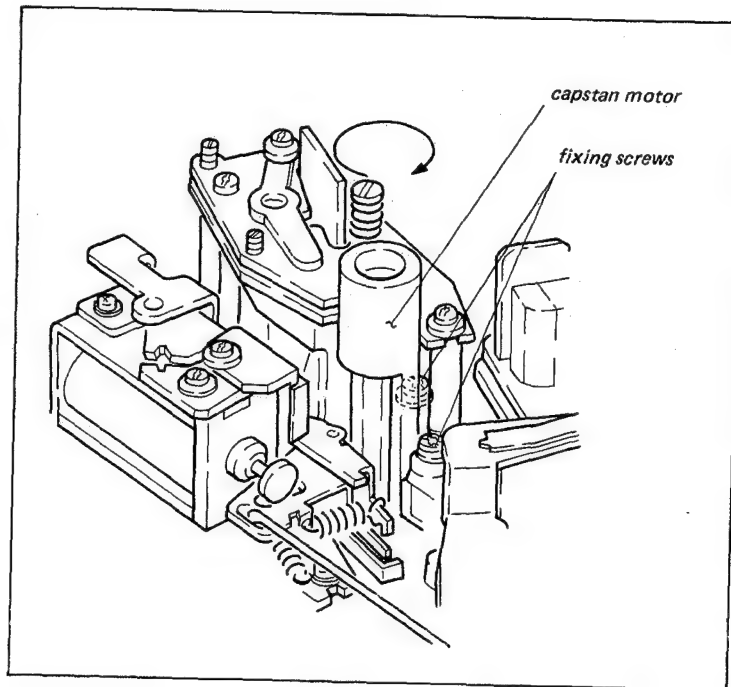
- (1) Open the VA-16 and the SS-23 boards.
- (2) Remove the drum and mechanical belts.
- (3) Remove the D motor pulley with allen wrench (each edge has 0.89mm).
- (4) Remove the TR board.
- (5) Replace the drum motor with the new one.
- (6) Install the D motor pulley through the motor shaft and install the motor shaft so that the positional relationship of the D motor pulley and motor shaft meets the required specification.
- (7) Clean the drum and mechanical belts and install the belts
- (8) Perform the adjustments as sec. 5-21.



## 5-7. REPLACEMENT OF CAPSTAN MOTOR

### Replacement procedure:

- (1) Remove the audio head block.
- (2) Open the VA-16 and the SS-23 boards.
- (3) Disconnect capstan motor connector, CN 112 from SS-23 board.
- (4) Remove the two fixing screws as shown in figure and remove the capstan motor.
- (5) Install the capstan motor. While turning the capstan motor in the clockwise direction viewing from top of the set and tighten the fixing screws.
- (6) Perform the adjustments as sec. 5-21.



## 5-8. REPLACEMENT OF UPPER DRUM

. The rotary video heads cannot be replaced individually, the whole upper drum assembly must be replaced when any one of these heads fails.

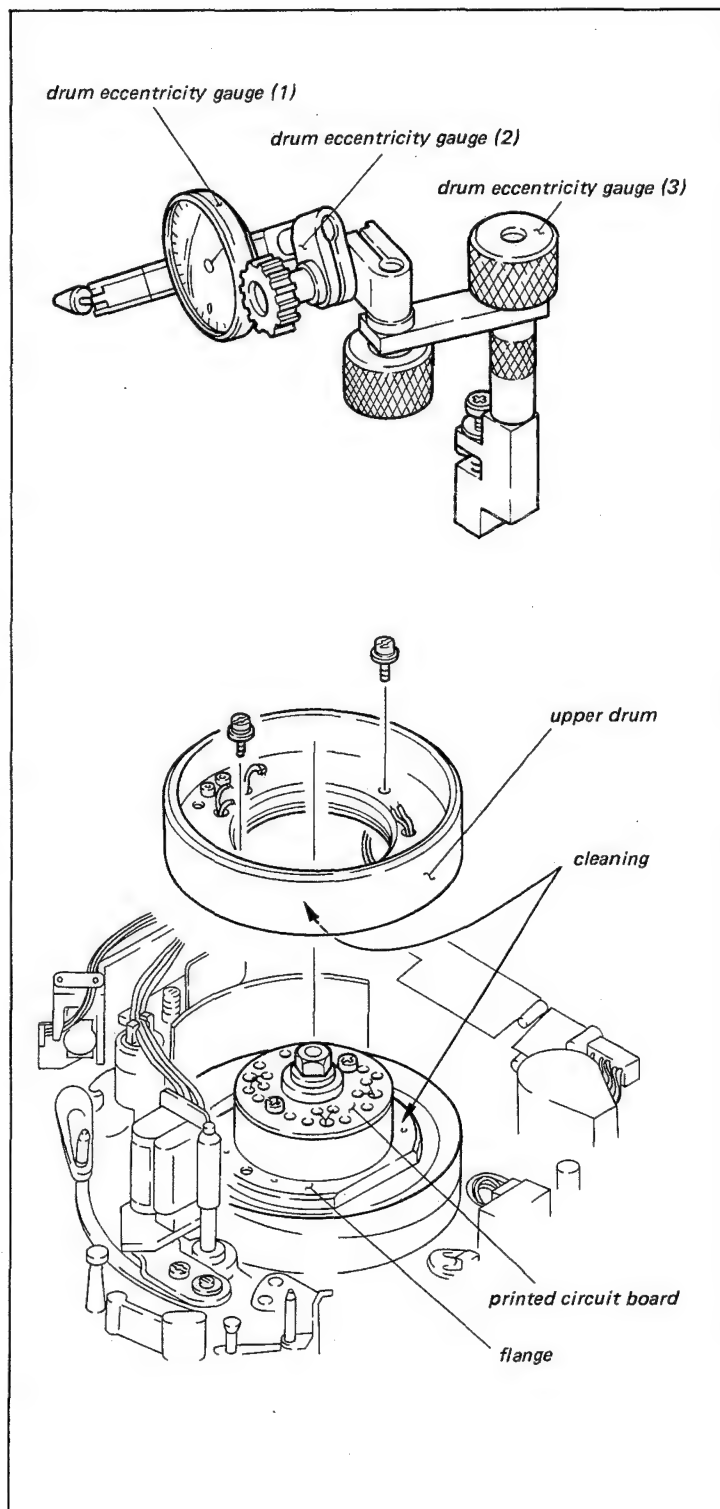
**Tool:** Drum eccentricity gauge (1)  
Drum eccentricity gauge (2)  
Drum eccentricity gauge (3)  
Drum eccentricity gauge (5)  
Cleaning fluid  
Cleaning piece

### Replacement procedure:

- (1) Unsolder the eight leads of the printed circuit board.
- (2) Remove the two screws and remove the upper drum.
- (3) Clean the matching surfaces of the flange and new upper drum assembly with a cloth moistened with cleaning fluid. (If there is a spacer between drum and flange, it should be remain in place, or be reinstalled in the same place with the new upper drum assembly. The spacer is 0.01mm, 0.03mm, 0.05mm or 0.1mm thick.)
- (4) Place the upper drum assembly so that the head of the white, yellow and orange leads is closest to the marked A of the printed circuit board and thread snugly with two screws but do not tighten.

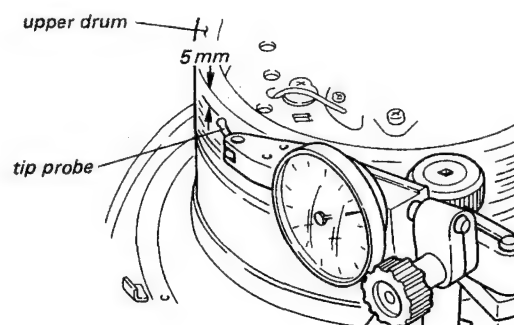
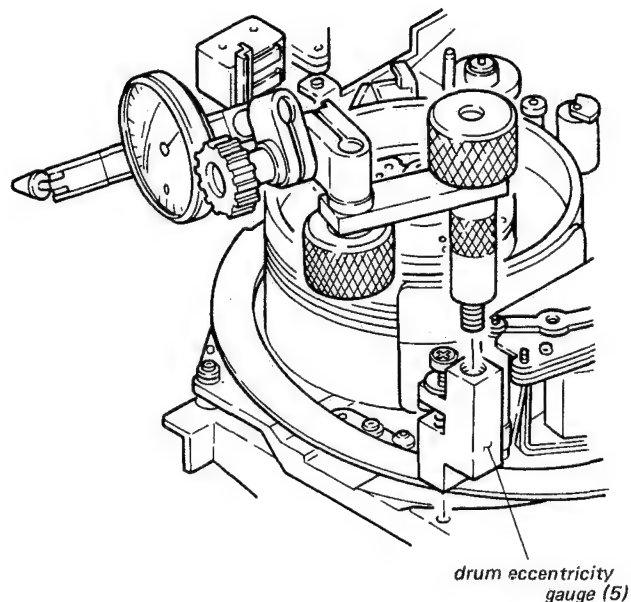
### Adjustment procedure:

- (1) Remove the TR board.
- (2) Assemble the drum eccentricity gauge (1),(2),(3) and (5) as shown in figure. Mount the assembled gauges on the machine so that the tip probe positions at the point about 5mm apart from the top edge of the upper drum.





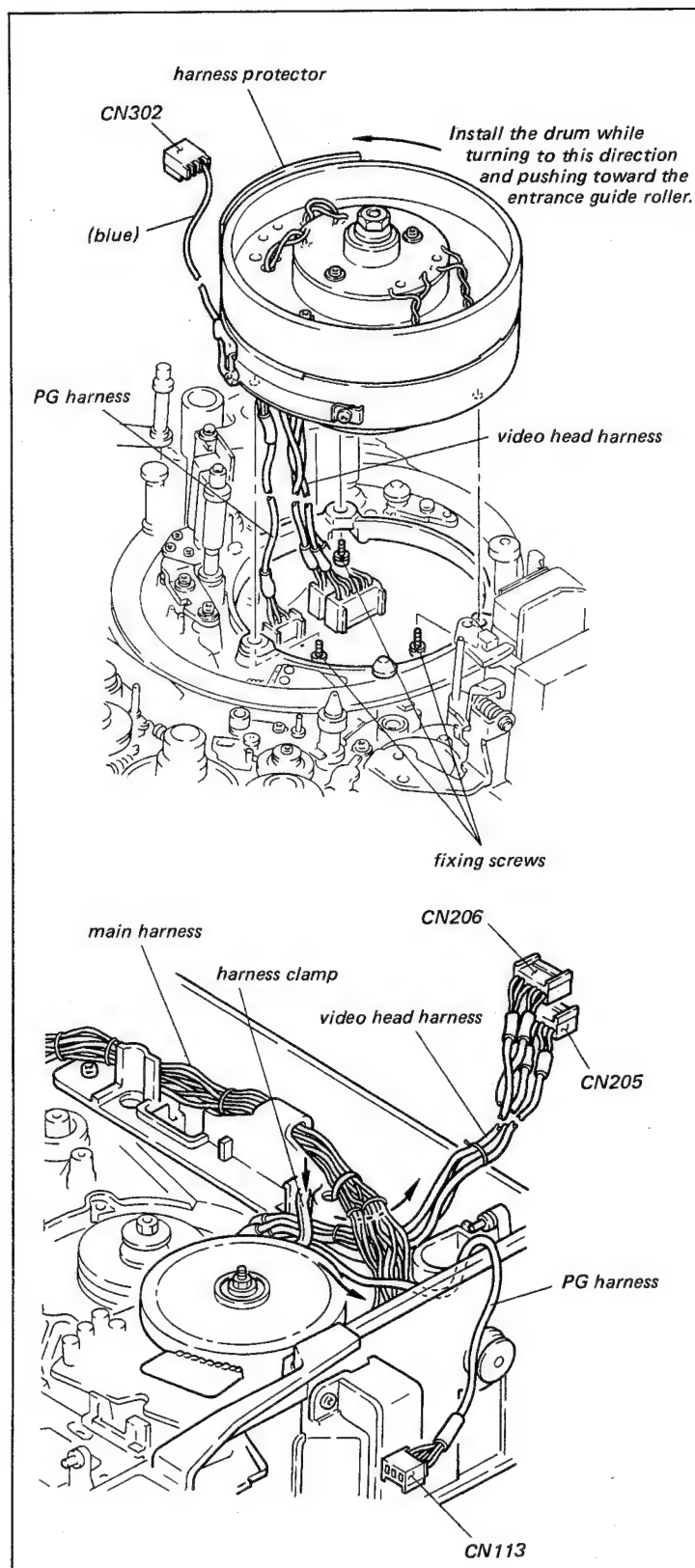
- (3) Turn the upper drum slowly clockwise direction and confirm the pointer deflection of the gauge is within 5micron during one complete turn of the upper drum. If this specification is satisfied, proceed to step (5). If it is not, perform then continue with remaining steps.
- (4) Tap the inside of the upper drum with a nylon hammer or a screwdriver handle so that the gauge deflection remains within 5micron.
- (5) After the adjustment, tighten the two screws that are securing the upper drum, alternately and gradually using a tightening torque: 8 Kg.cm
- (6) After the screws are tightened, check again that the eccentricity of the upper drum is within 5micron.
- (7) Solder the eight leads from the video heads to the printed circuit board.
- (8) Perform the adjustment as sec. 5-21.

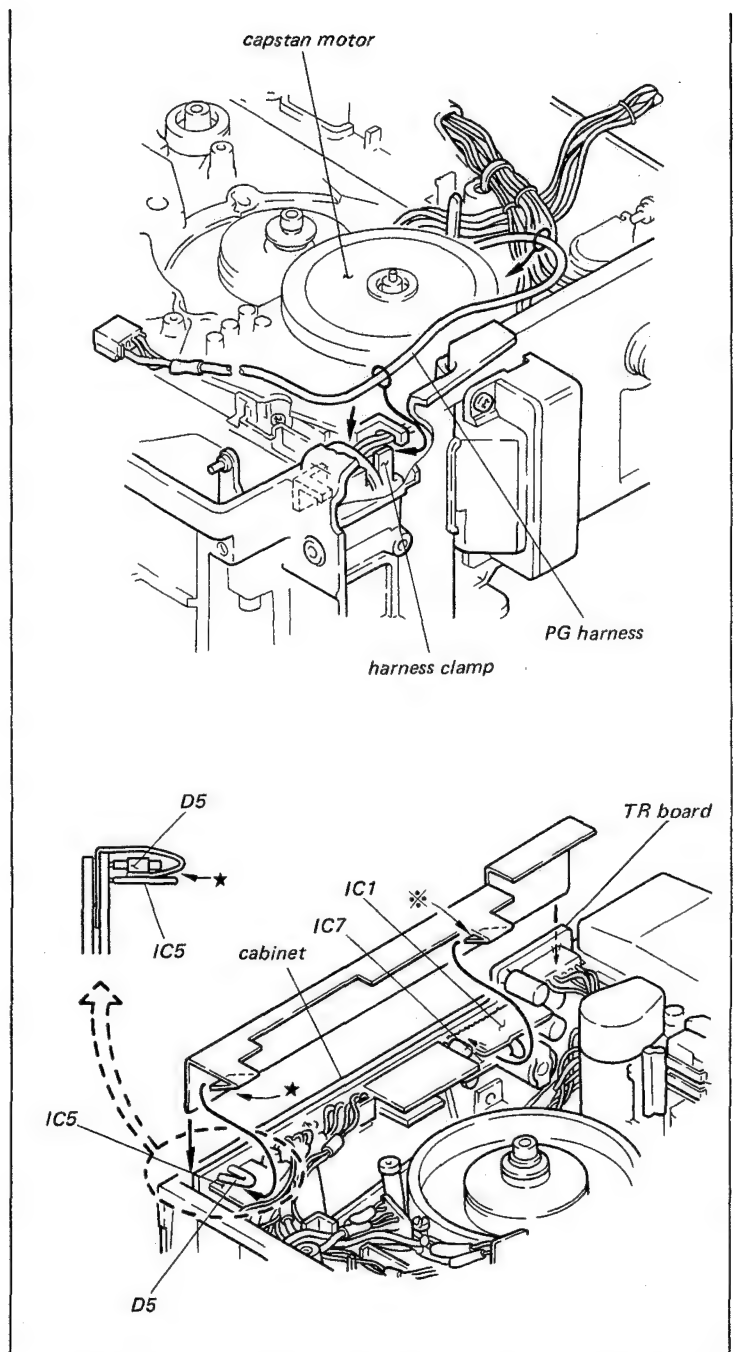


## 5-9. REPLACEMENT OF DRUM ASSEMBLY

### Replacement procedure:

- (1) Open the VA-16 and the SS-23 boards.
- (2) Disconnect the four connectors, CN113/SS-23 board, CN205 and CN206/VA-16 board and CN2/TR-15 board.
- (3) Remove the three fixing screws on the back of the set and remove the defective drum.
- (4) Install the drum on the base while turning the drum ass'y in the counter-clockwise direction and pushing the drum toward the entrance tape guide viewing from the top of set.
- (5) Arrange the drum harness as shown in figure and insert the connector.
- (6) Perform the adjustments as sec. 5-21.

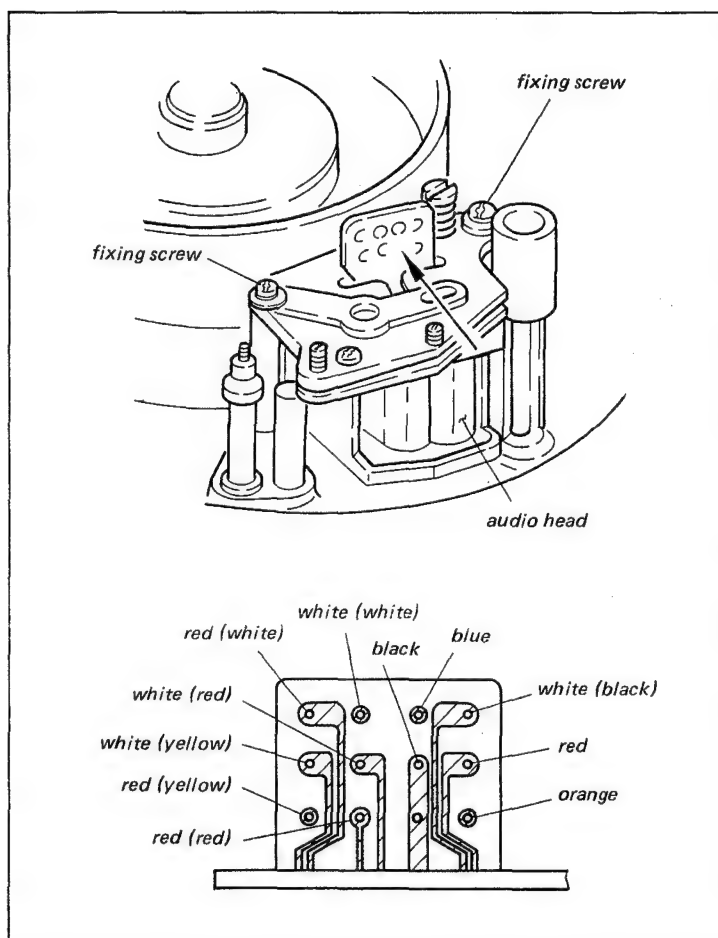




## 5-10. REPLACEMENT OF AUDIO HEAD

### Replacement procedure:

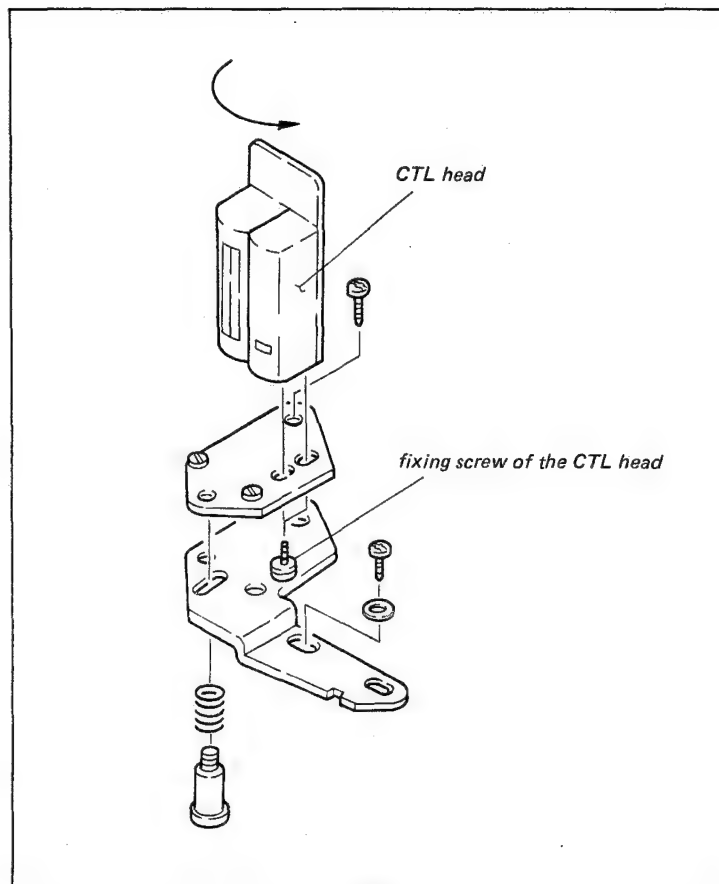
- (1) Remove the harness from the audio head.
- (2) Remove the audio head block.
- (3) Replace the audio head, and tighten the audio head while pushing the audio head in the direction of the arrow.  
Solder the harness as shown in figure.
- (4) Install the audio head block and perform the adjustments as sec.5-21.



## 5-11. REPLACEMENT OF CTL HEAD

### Replacement procedure:

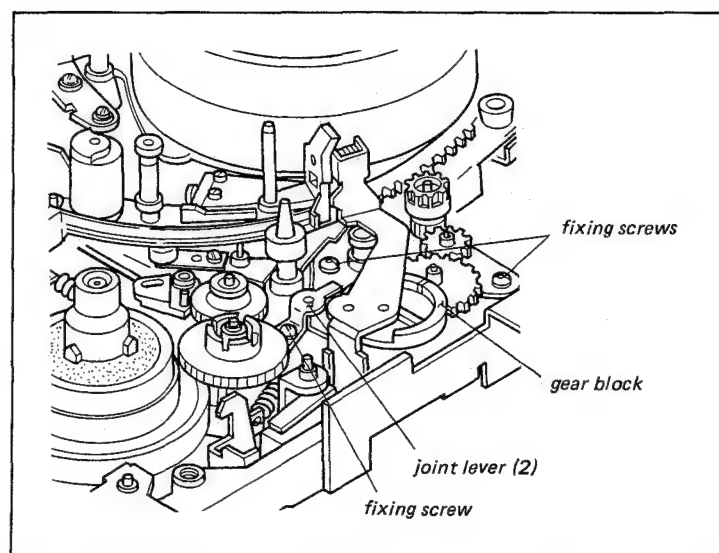
- (1) Remove the harness from the CTL head and connect it to the new CTL head.
- (2) Remove the CTL head block.
- (3) Remove the fixing screws of the CTL head.
- (4) Install the new CTL head to the CTL head block while turning the head to the direction as shown in figure.
- (5) Install the CTL head block and perform the adjustments as sec. 5-21 .



## 5-12. REPLACEMENT OF GEAR BLOCK

### Replacement procedure:

- (1) Remove the EJECT belt.
  - (2) Remove the fixing screw of the joint lever (2).
  - (3) Open the VA-16 and the SS-23 boards.
  - (4) Remove the threading motor belt and pulley.
  - (5) Remove the two fixing screws of gear block and remove the gear block.
  - (6) Install the new gear block.
- Perform the adjustments as sec. 5-21.

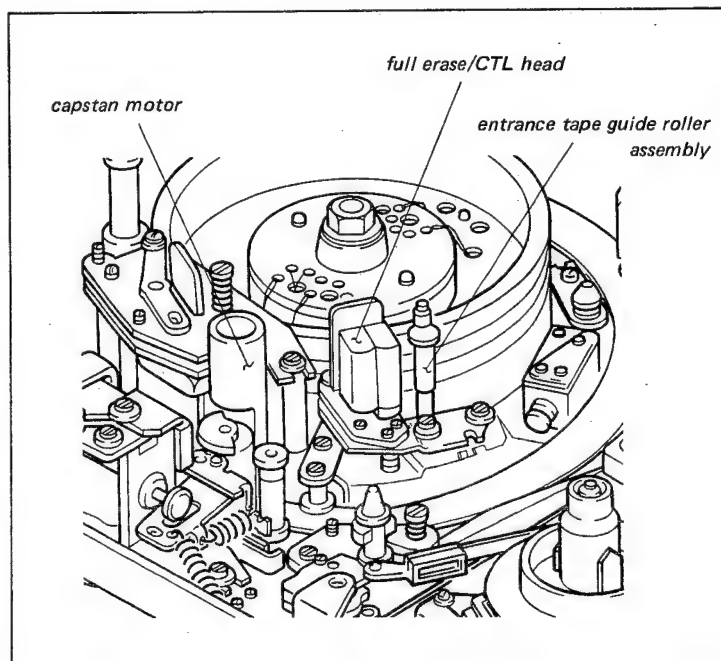


### 5-13. REPLACEMENT OF ENTRANCE TAPE GUIDE ROLLER ASSEMBLY

. The component parts of the entrance tape guide roller ass'y cannot be replaced individually since the entrance tape guide roller ass'y is prepared as a whole assembly as shown in figure.

#### Replacement procedure:

- (1) Remove the audio head block.
- (2) Open the VA-16 and the SS-23 boards.
- (3) Remove the capstan motor.
- (4) Remove the fixing screw on the back of chassis and replace the entrance tape guide roller ass'y.
- (5) Install the capstan motor and the audio head block (see sec.5-7 and sec. 5-10).
- (6) Perform the adjustments as sec. 5-21.

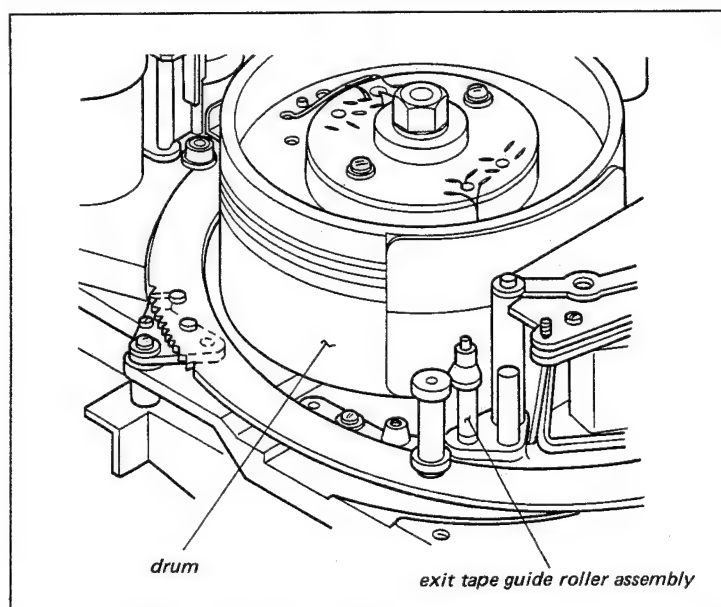


### 5-14. REPLACEMENT OF EXIT TAPE GUIDE ROLLER ASSEMBLY

. The component parts of the exit tape guide roller ass'y cannot be replaced individually since the exit tape guide roller ass'y is prepared as a whole assembly as shown in figure.

#### Replacement procedure:

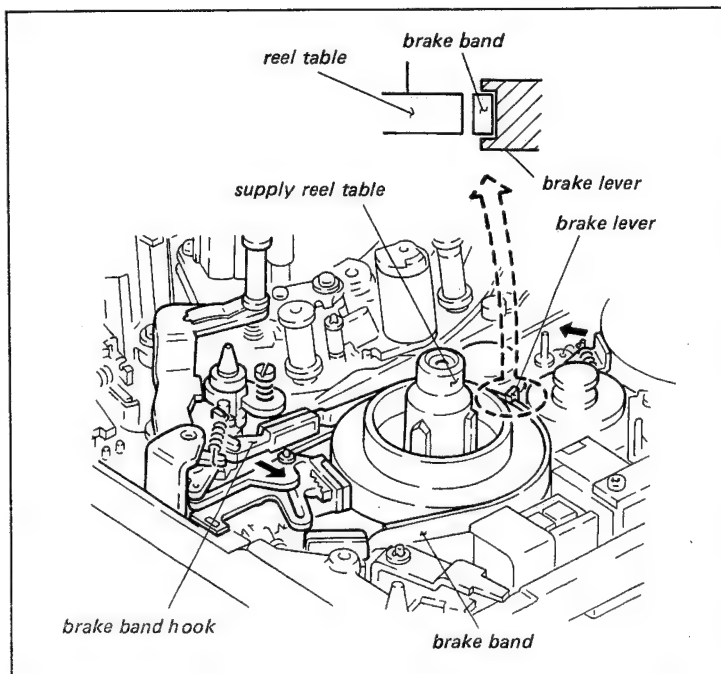
- (1) Open the VA-16 and the SS-23 boards.
- (2) Remove the fixing screw of exit tape guide roller ass'y on the back of the chassis and replace the exit tape guide roller ass'y.
- (3) Perform the adjustments as sec. 5-21.



## 5-15. REPLACEMENT OF BRAKE BAND

### Replacement procedure:

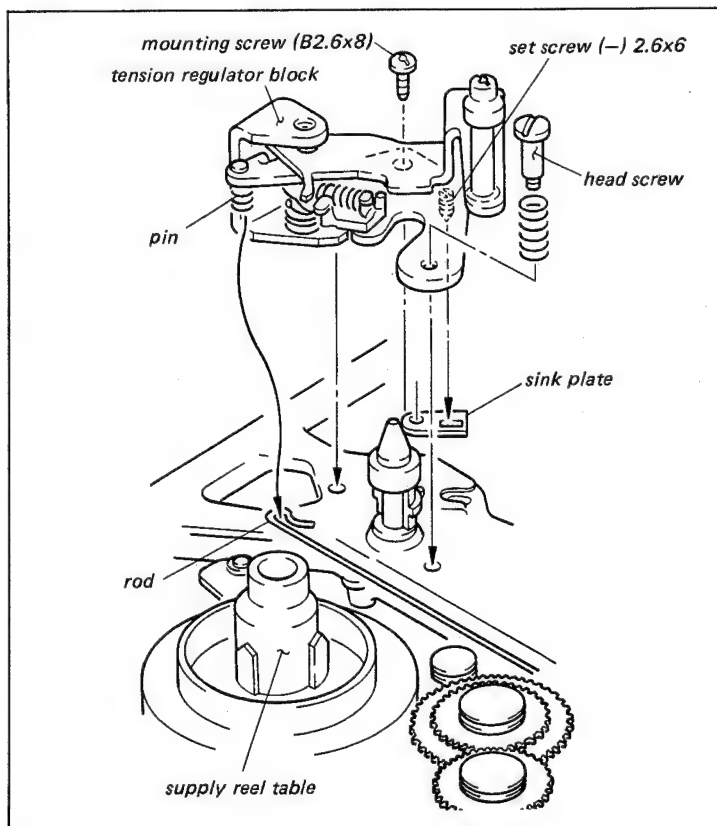
- (1) Remove the supply reel table. (See sec.5-1) Check that the thrust bearing and poly-slider washer have remained on the reel shaft. When they are removed with the reel table, install them on the reel shaft as shown in figure (see sec.5-1).
- (2) Pull out the brake band hook in the direction of the arrow and remove it.
- (3) Remove the brake band.
- (4) Install the new brake band. Insert the brake band between the two claws of the brake lever as shown in figure.
- (5) After replacement, perform the adjustments as sec. 5-21.



## 5-16. REPLACEMENT OF TENSION REGULATOR BLOCK

### Replacement procedure:

- (1) Remove the head screw and mounting screw.
- (2) Remove pin of the tension regulator block from the rod and then remove the tension regulator block.
- (3) Check that the sink plate is positioned as shown in figure.
- (4) Hook the new tension regulator pin onto the rod.
- (5) Insert the projection on the bottom of tension regulator into the hole of the chassis and screw the mounting screw (B2.6 x 8) about 3 to 4 turns.
- (6) Replace the compression spring on the head screw. Install the tension regulator block to the chassis.
- (7) Remove the set screw (-) 2.6 x 6 from the old tension regulator block and screw it about 4 to 5 turns into new block.
- (8) After replacement, perform the adjustments as sec. 5-21.



## 5-17. REPLACEMENT OF PINCH ROLLER ASSEMBLY (INCLUDING THE VERTICAL PLAY ADJUSTMENT)

### Replacement procedure:

- (1) Remove the pinch roller ass'y from the threading ring.
- (2) Never remove the poly slider washer beneath the pinch roller ass'y as shown in figure.
- (3) Install the replacement pinch roller ass'y.
- (4) Insert the poly slider washer at the upper portion of pinch roller ass'y and secure it with an E type retaining ring.
- (5) Push up and down the pinch roller ass'y for inspection. Adjust the poly slider washer on top of the pinch roller ass'y so that the vertical play meets the required specification.

Adjustment poly-slider washer

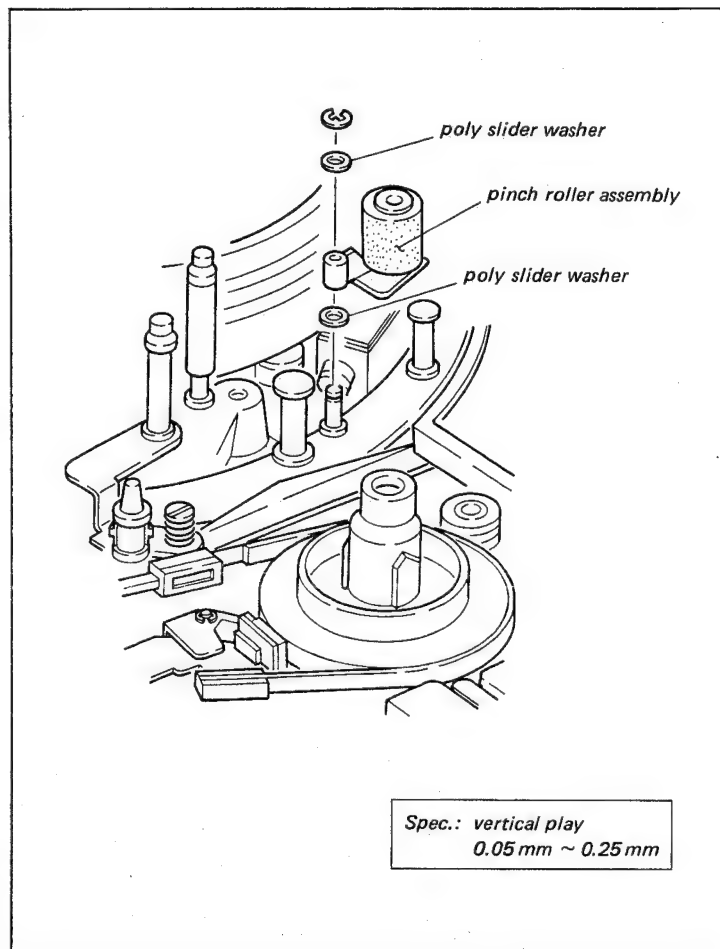
3-701-436-01 1.6mm dia. 0.13mm thick

3-701-436-11 1.6mm dia. 0.25mm thick

3-701-436-21 1.6mm dia. 0.5 mm thick

- (6) Put the machine into the threading completion mode.

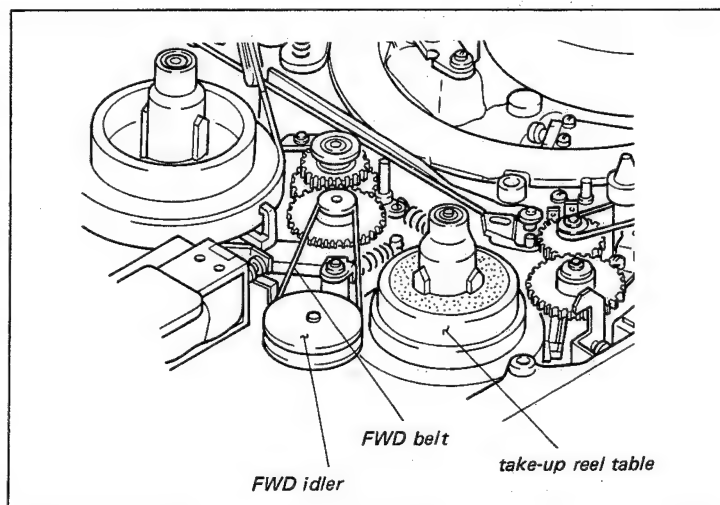
Perform the sec.6-6-6 Pinch Press Lever Height Adjustment. After replacement, confirm the step (5).



## 5-18. REPLACEMENT OF FWD IDLER

### Replacement procedure:

- (1) Remove the FWD belt.
- (2) Remove the E type retaining ring and remove the FWD idler.
- (3) Clean the shaft with a cloth moistened with cleaning fluid.
- (4) Apply a drop of oil at the top portion of the shaft.
- (5) Install the new idler.
- (6) Perform the adjustments as sec.5-21.

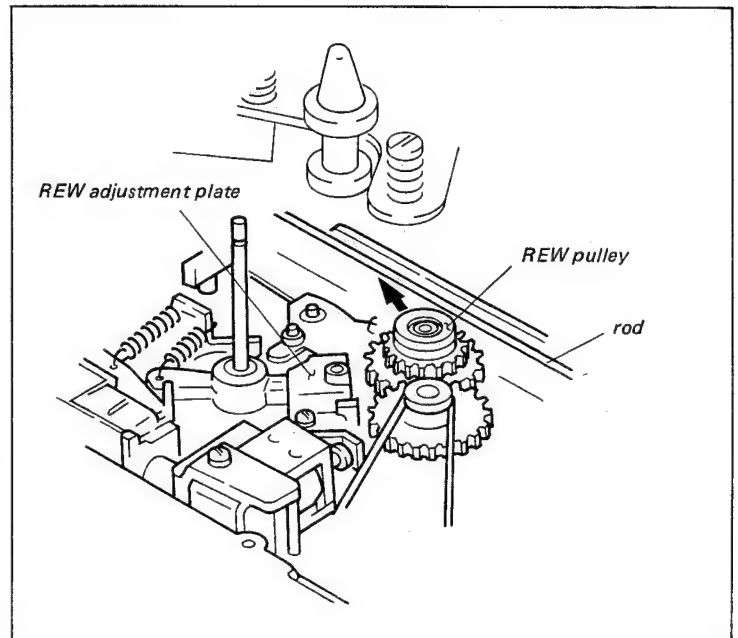




## 5-19. REPLACEMENT OF REW PULLEY

### Replacement procedure:

- (1) Remove the supply reel table (see sec. 5-1). Check that the thrust bearing and poly slider washer have remained on the reel shaft. When they are removed with the reel table, install them on the reel shaft as shown in sec.5-1.
- (2) Remove the REW adjustment plate.
- (3) Remove the cap of the REW pulley in the same manner as the reel table replacement.
- (4) Remove the REW pulley while pressing the REW pulley in the direction of the arrow and pressing the rod to the drum simultaneously.
- (5) Clean the shaft with a cloth moistened with cleaning fluid.
- (6) Thread the poly slider washer (2mm dia. 0.25mm thick) through the shaft and apply a drop of oil at the top portion of the shaft.
- (7) Install the new REW pulley.
- (8) After installing, perform the sec. 6-2-3 REW adjustment plate position adjustment.
- (9) Apply a drop of oil on the supply reel shaft and install the reel table (see sec.5-1).



## 5-20. REPLACEMENT OF REED SWITCH

**Mode:** Take finger off the cassette in shaft when the threading ring is rotate about 180 degrees from the unthreading end state.

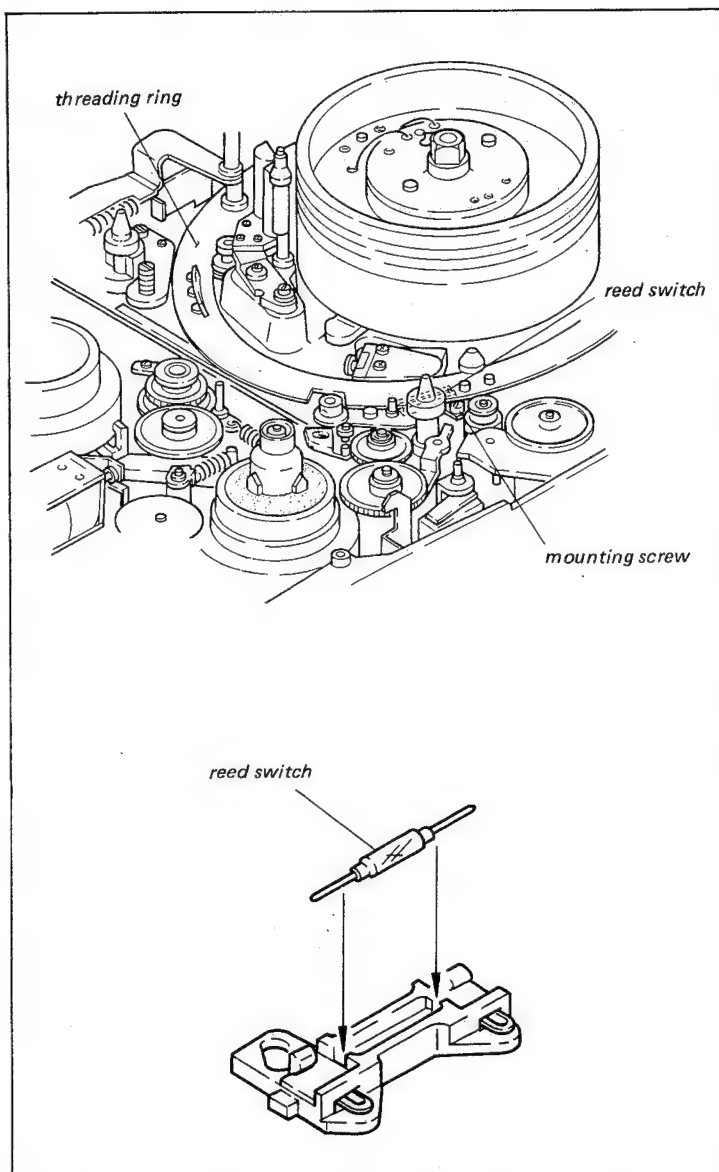
### Replacement procedure:

- (1) Put the machine in the above mode.
- (2) Open the VA-16 and SS-23 board.
- (3) Unsolder the jumper leads on the flexible board FL-7 from the reed switch.
- (4) Remove the reed switch block.
- (5) Remove the reed switch.
- (6) Solder the new reed switch to the switch terminal.

### (CAUTION)

Do not apply soldering iron for more than 3 seconds on any one terminal.

- (7) Install the reed switch block on the VTR and adjust the position.



## 5-21. ADJUSTMENT ITEM TABLE AFTER MAIN PARTS REPLACEMENT

### Replacement of Supply Reel Table

Reel Table Height Adjustment (6-1) —→ S Soft Brake Torque Adjustment (7-1)  
—→ FWD Back Tension Adjustment (7-4) —→ Video Tracking Adjustment (8-2)  
(When the tracking adjustment is performed, adjust referring "Adjustment steps of Tracking Adjustment", described on Sec.8 Adjustment Information.)

### Replacement of Take-up Reel Table

Reel Table Height Adjustment (6-1) —→ T Soft Brake Torque Adjustment (7-2)  
—→ T Main Brake Torque Adjustment (7-3) —→ FWD Torque Measurement (7-5)  
—→ Tape Run Adjustment (T Drawer Guide Slantness Adjustment) (8-1-2)

### Replacement of Threading Motor

Tape Run Adjustment (T Drawer Guide Slantness Adjustment) (8-1-2) —→ Servo System Adjustment

### Replacement of Upper Drum

Upper Drum Eccentricity Adjustment (5-8) —→ Video Tracking Adjustment (8-2)  
(When the tracking adjustment is performed, adjust referring "Adjustment Steps of Tracking Adjustment", described on Sec.8 Adjustment Information.)  
—→ Video Head Dihedral Adjustment (8-3) —→ CTL Head Position Adjustment (8-4)  
—→ TC Head Position Adjustment (8-5) —→ Switching Position Adjustment (8-6)  
—→ Video Head Overlap Amount Check (8-7) —→ Video System Adjustment

### Replacement of Drum Assembly

Servo System Adjustment —→ Adjust referring "Adjustment Steps of Tracking Adjustment", described on Sec.8 Adjustment Information —→ Video System Adjustment

### Replacement of Drum Motor

Servo System Adjustment

### Replacement of Capstan Motor

Threading End Position Adjustment (6-5-3) —→ Stopper Arm B Position Adjustment (6-5-4) —→ Threading End Switch Position Adjustment (6-5-5) —→ Pinch Press Mechanism Block Position Adjustment (6-6-5) —→ Tape Run Adjustment Around Pinch Roller (8-1-1) —→ Video Tracking Adjustment (8-2) (When the tracking adjustment is performed, adjust referring "Adjustment Steps of Tracking Adjustment", described on Sec.8 Adjustment Information) —→ Servo System Adjustment

#### Replacement of Audio/TC Head

Audio/TC Head Zenith Adjustment (8-13) —→ Audio Head Height Adjustment (8-11) —→ Audio Head Phase Adjustment (8-12) —→ Audio Confi. Head Tape to Head Contact Adjustment (8-14) —→ Audio Head Phase Adjustment (8-12) —→ Audio/TC Head Zenith Adjustment (8-13) —→ Video Tracking Adjustment (8-2) (When the tracking adjustment is performed, adjust referring "Adjustment steps of Tracking Adjustment", described on Sec.8 Adjustment Information.) —→ TC Head Position Adjustment (8-5) —→ Audio System Adjustment —→ Time Code System Adjustment

#### Replacement of CTL Head

CTL Head Azimuth Adjustment (8-8) —→ CTL Head Height Adjustment (8-9) —→ Full Erase/CTL Head Zenith Adjustment (8-10) —→ Video Tracking Adjustment (8-2) (When the tracking adjustment is performed, adjust referring "Adjustment Steps of Tracking Adjustment", described on Sec.8 Adjustment Information.) —→ CTL Head Position Adjustment (8-4) —→ TC Head Position Adjustment (8-5) —→ Audio System Adjustment

#### Replacement of Gear Block

Gear Block Position Adjustment (6-5-1) —→ Joint Lever (2) Position Adjustment (6-4-3)

#### Replacement of Entrance Roller Guide Ass'y/Exit Roller Guide Ass'y

Adjust referring "Adjustment Steps of Tracking Adjustment", described on Sec.8 Adjustment Information.

#### Replacement of Brake Band

Tension Regulator Operation Position Adjustment (6-4-2) —→ T Coil Sensor Position Adjustment (6-7) —→ Joint Lever(2) Position Adjustment (6-4-3) —→ FWD Back Tension Adjustment (7-4)

#### Replacement of Tension Regulator Block

Tension Regulator Slantness Adjustment (6-4-1) —→ Gear Block Position Adjustment (6-5-1) —→ Tension Regulator Operating Position Adjustment (6-4-2) —→ T Coil Sensor Position Adjustment (6-7) —→ Joint Lever (2) Position Adjustment (6-4-3) —→ FWD Back Tension Adjustment (7-4) —→ Video Tracking Adjustment (8-2) —→ Adjust referring "Adjustment Steps of Tracking Adjustment", described on Sec.8 Adjustment Information.

#### Replacement of Pinch Roller

Thread End Position Adjustment (6-5-3) —→ Stopper Arm B Position Adjustment (6-5-4) —→ Threading End Switch Position Adjustment (6-5-5) —→ Pinch Press Mechanism Block Position Adjustment (6-6-5) —→ Tape Run Adjustment Around Pinch Roller (8-1-1)

## SECTION 6

# LINK AND DRIVE SYSTEM ALIGNMENT

### ALIGNMENT INFORMATION

#### MODE

##### . Unthreading end mode

It means EJECT completion mode.

The threading guide, tension regulator arm and threading ring are put back at the cassette tape side completely.

##### . Threading end mode

- (1) Connect the Head Amp. block of PB alignment checker to VTR.
- (2) Turn the SAVE/STANDBY switch of checker into STANDBY.
- (3) Keep pushing the cassette in shaft till the threading ring rotation is stopped.

This state means the threading end mode.

##### . Threading mode

- (1) Connect the Head Amp. block of the PB alignment checker to VTR.
- (2) Turn the SAVE/STANDBY switch of checker into STANDBY.
- (3) Push the cassette in shaft and rotate the threading ring. Threading mode means that this threading ring is rotating.

##### . PLAY mode without cassette tape

- (1) Connect the Head Amp. block of the PB alignment checker to VTR.
- (2) Turn the SAVE/STANDBY switch of checker into STANDBY.
- (3) Keep pressing the cassette in shaft till the threading ring rotation is stopped.
- (4) Turn the START/STOP switch of checker into START. This state means the PLAY mode without cassette tape.

##### . PLAY mode

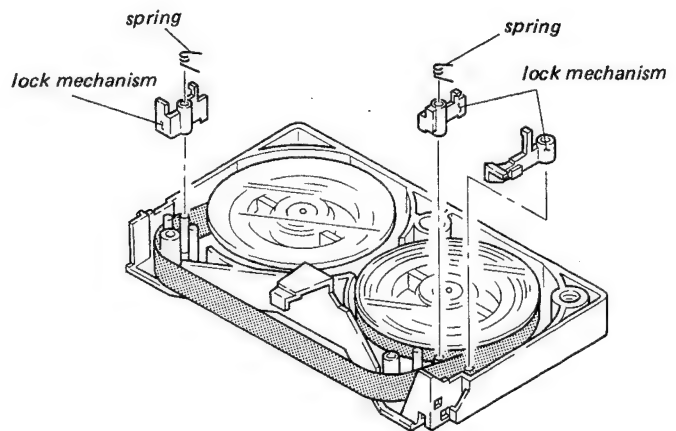
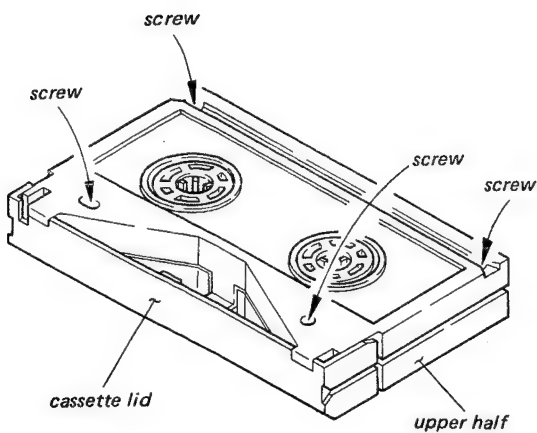
- (1) Connect the Head Amp. block of the PB alignment tape to VTR.
- (2) Insert a cassette tape into VTR.
- (3) Turn the SAVE/STANDBY switch of checker into STANDBY. (Threading starts)
- (4) Turn the START/STOP switch of checker into START.  
This state means the PLAY mode.

### HOW TO MAKE THE CASSETTE TAPE WITHOUT LID

Since the VTR is designed compact size, the check and adjustment can not be performed if cassette tape lid is installed.

The cassette tape lid removal procedures are as follows:

- (1) Remove the four screws on the back of the cassette as shown in figure, and remove the upper half of the cassette.
- (2) Remove the lock mechanism parts and the springs on the left and right.
- (3) Remove the cassette lid from the upper half.
- (4) Install the upper half on the lower half with four screws from the back side.



### 6-1. REEL TABLE HEIGHT ADJUSTMENT

Adjust the reel table so that its position is 0.13mm higher than the adjusted position by the limit gauge of the cassette reference plate, proper tape path can then be obtained.

**Mode:** Unthreading end

**Tool:** cassette reference plate

#### Adjustment procedure:

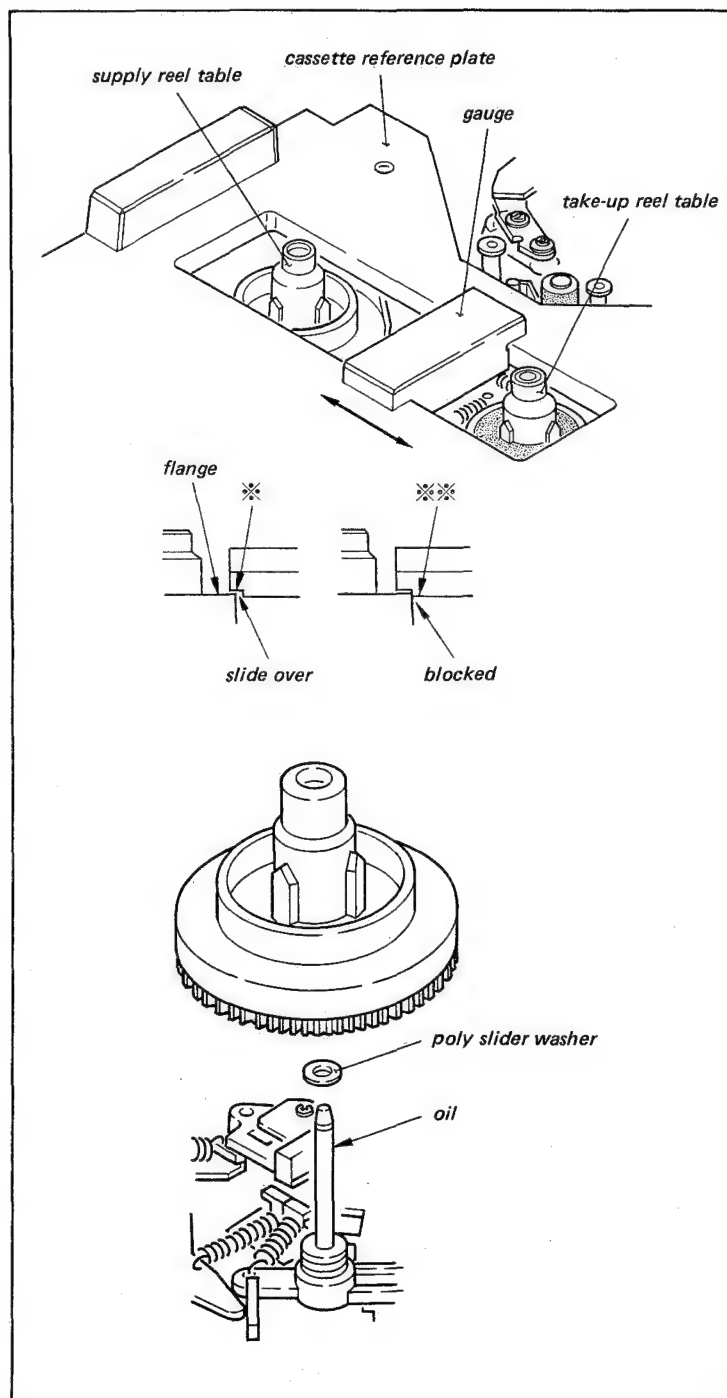
- (1) Put the cassette reference plate in the cassette position.
- (2) Move the gauge as shown in figure. Adjust height by varying the number of washers under the reel table so that the \* marked portion of the gauge can slide over the reel table, while the \*\* marked portion is blocked, and cannot slide over reel table.
- (3) After completing step (2), insert a poly slider washer, 0.25mm thick, under the reel supply table.
- (4) Apply a drop of SONY oil at the position as shown in figure and install the reel table.

poly slider washer for adjustment

0.13mm thick : 3-701-439-01

0.25mm thick : 3-701-439-11

0.5mm thick : 3-701-439-21



## 6-2. FUNCTION SYSTEM ADJUSTMENT

### 6-2-1. FWD Solenoid Position Adjustment

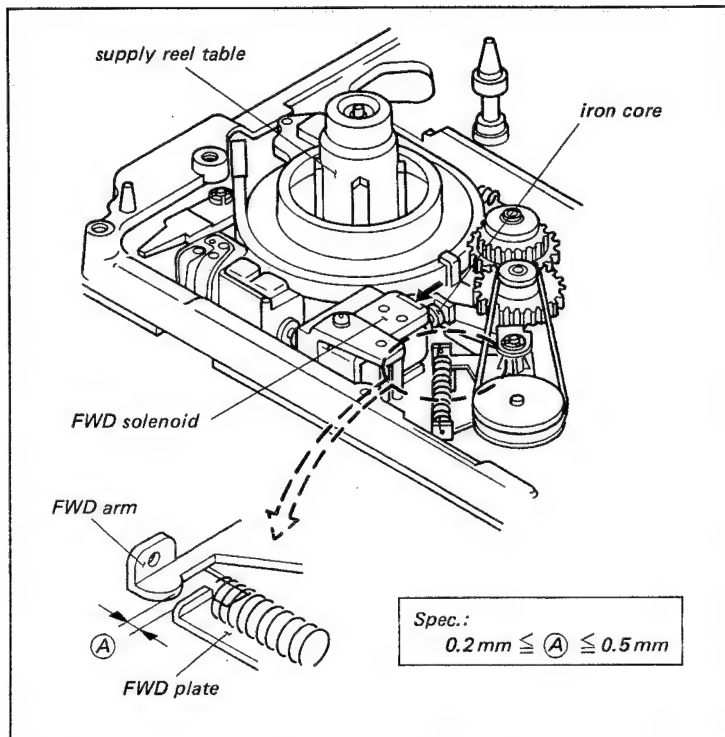
**Mode:** Unthreading end

**Check procedure:**

- (1) Push the iron core into the fully energized position in the direction of the arrow.
- (2) Check that the clearance between the FWD plate and the FWD arm meets the required specification.

**Adjustment procedure:**

- (1) Open the VA-16 and the SS-23 boards.
  - (2) Loosen the two screws of the FWD solenoid from rear of the chassis.
- Adjust the position of the FWD solenoid so that it meets the required specification.



### 6-2-2. FWD Stopper Position Adjustment

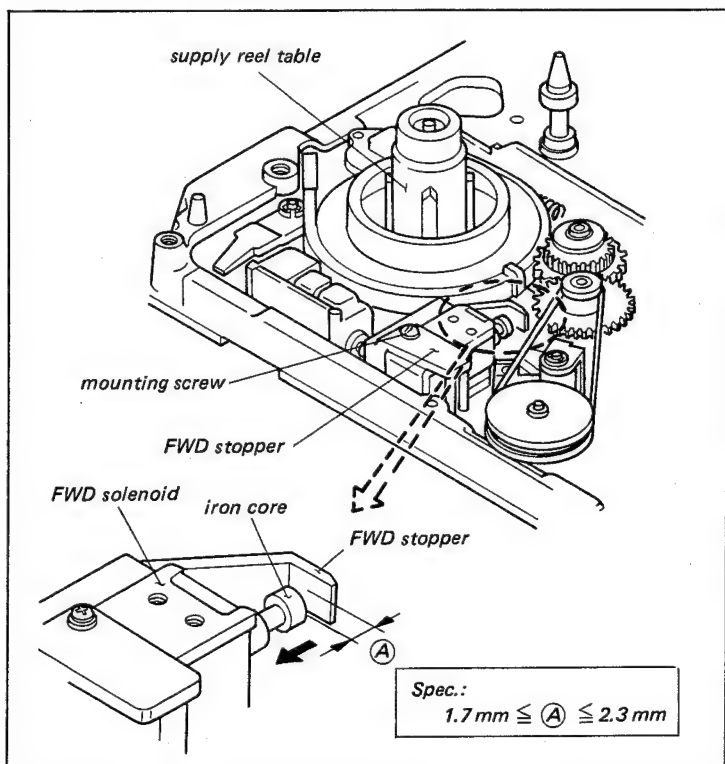
**Mode:** Unthreading end

**Check procedure:**

- (1) Push the iron core into the fully energized position in the direction of the arrow.
- (2) Check that the clearance between the end of iron core and the FWD stopper meets the required specification.

**Adjustment procedure:**

- (1) Adjust the position of the FWD stopper so that it meets the required specification.





### 6-2-3. REW Adjusting Plate Position Adjustment

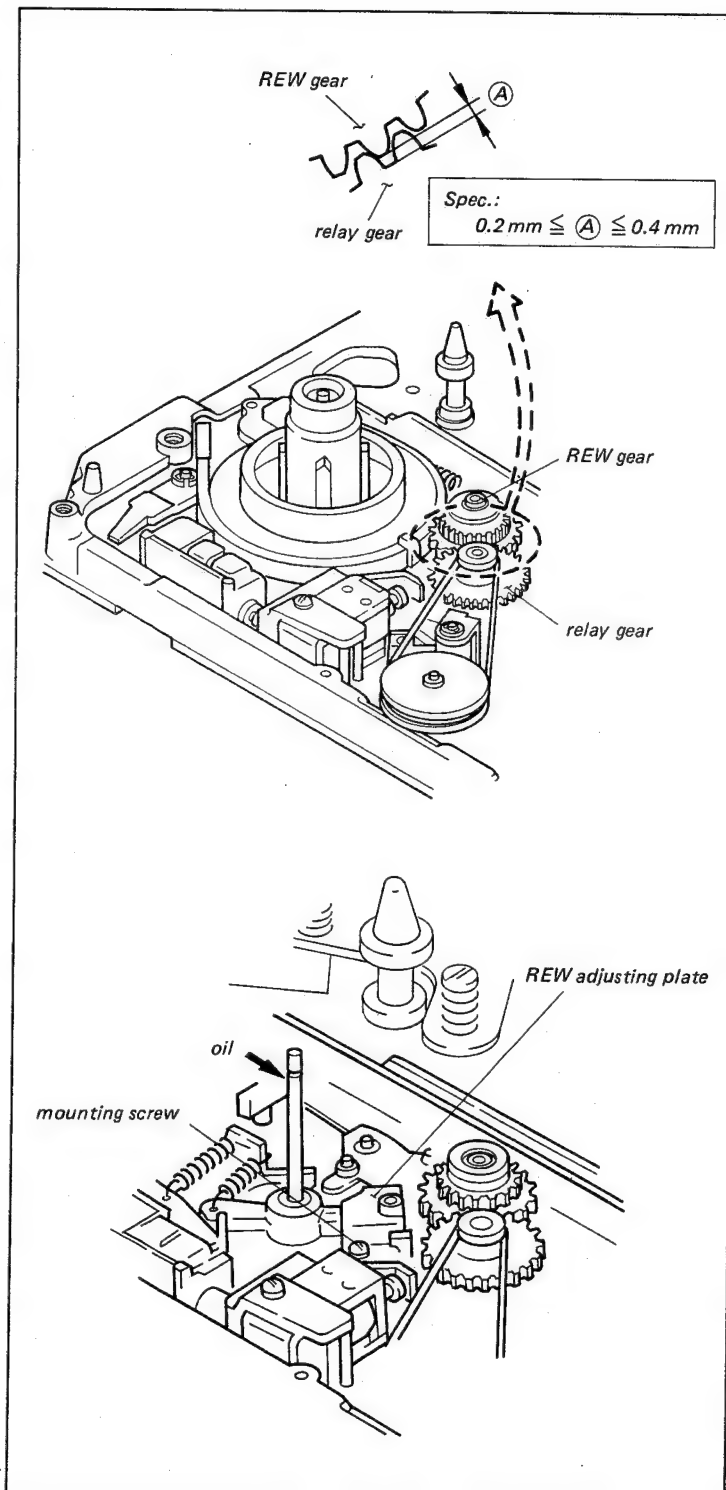
**Mode:** Unthreading end

**Check procedure:**

- (1) Push the REW button to the left as far as it will go.
- (2) Check that the clearance between the REW gear and the relay gear meets the required specification.
- (3) Return the REW button to the home position. Check that the REW gear does not contact with relay gear.

**Adjustment procedure:**

- (1) Remove the supply reel table.  
Check that the thrust bearing and the poly slider washer remain on the reel shaft. When the thrust bearing and the poly slider washer are removed with reel table, install them on the reel shaft as shown in sec 5.
- (2) Adjust the position of the REW adjusting plate so that it meets the required specification.
- (3) Apply a drop of oil on the supply reel shaft and install the reel table. (See sec. 5.)



#### 6-2-4. Arm Adjusting Plate Position Adjustment

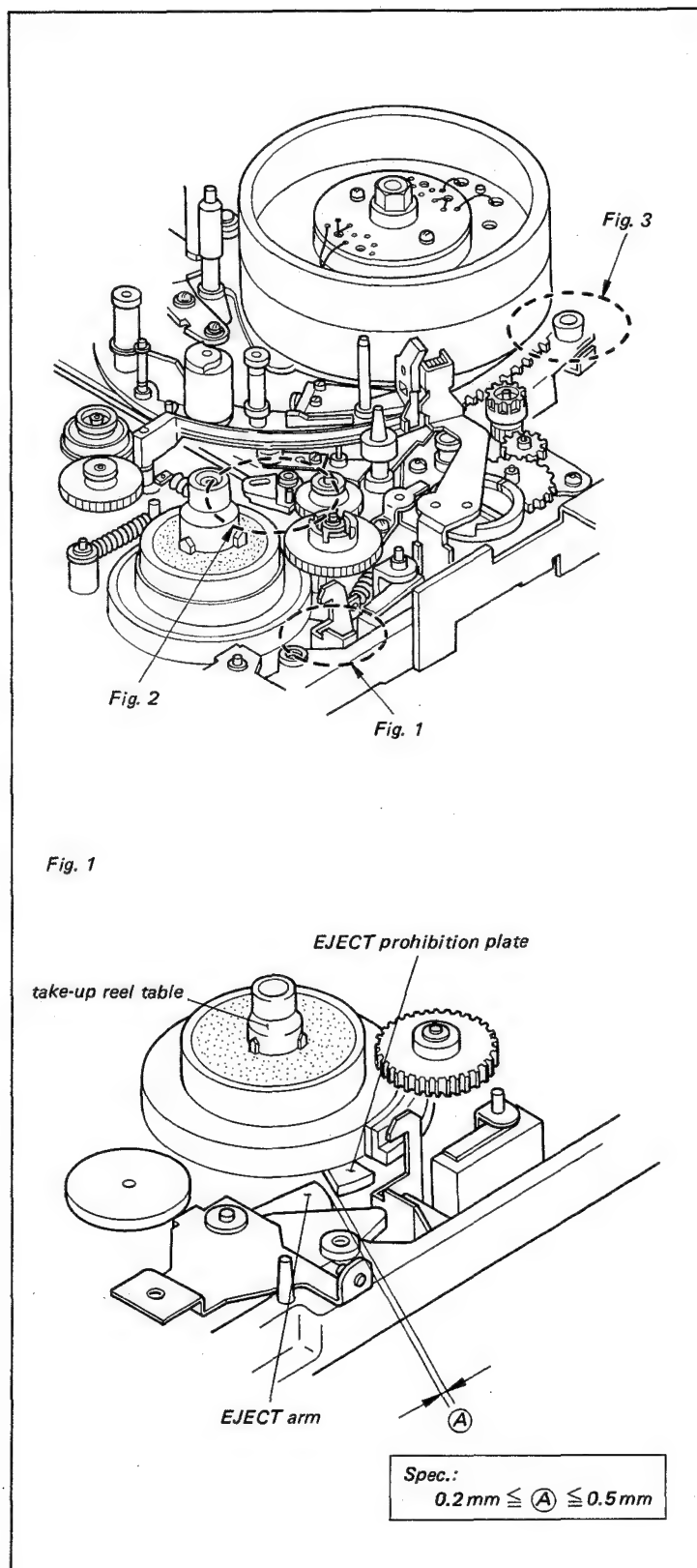
**Mode:** Unthreading end

**Check procedure:**

- (1) Push the EJECT button to the right as far as it will go.
- (2) Check that the clearance between the EJECT prohibition plate and the EJECT arm meets the required specification.

**Adjustment procedure:**

- (1) Use string to hold the EJECT button in position so that the clearance between the EJECT prohibition plate and the EJECT arm can be checked.
- (2) Loosen the mounting screw of the arm adjusting plate about one turn.
- (3) Insert the flatblade screw driver, 2mm dia. into the notch of arm adjusting plate. Turn the driver so that the required specification is met while pressing the roller of the stopper arm B to the threading ring.
- (4) Tighten the screw and confirm as check procedure.



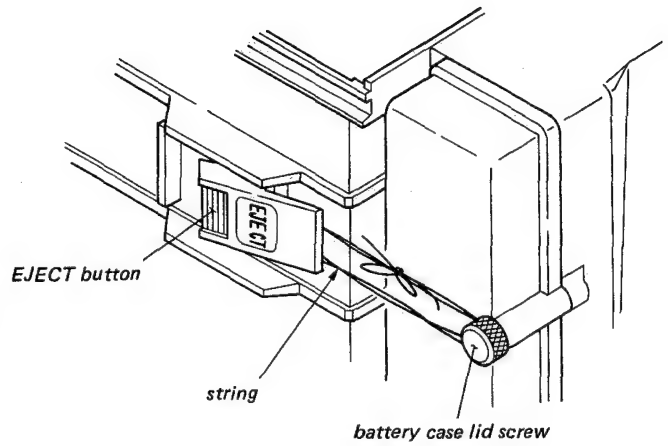


Fig. 2

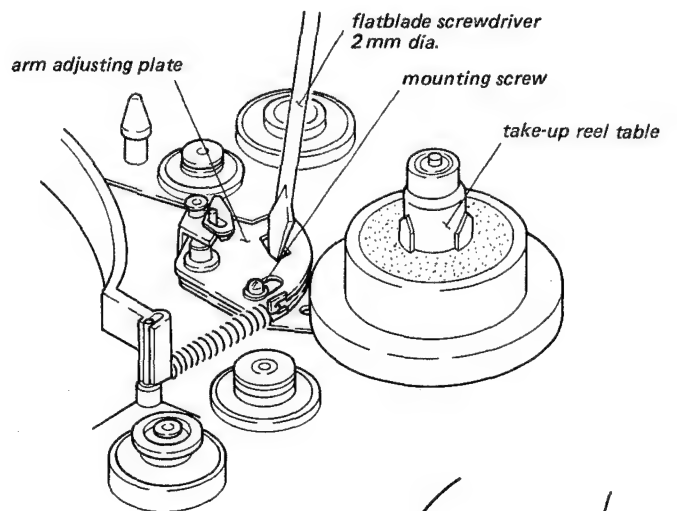
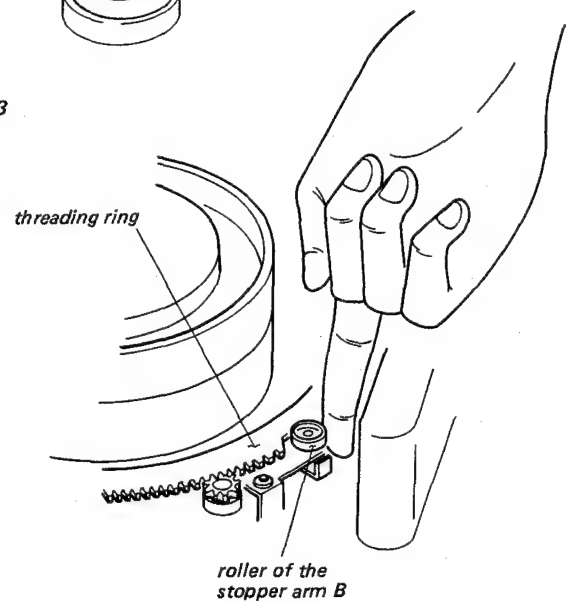


Fig. 3



### 6-3. BRAKE SYSTEM ADJUSTMENT

#### 6-3-1. T Brake Solenoid Position Adjustment

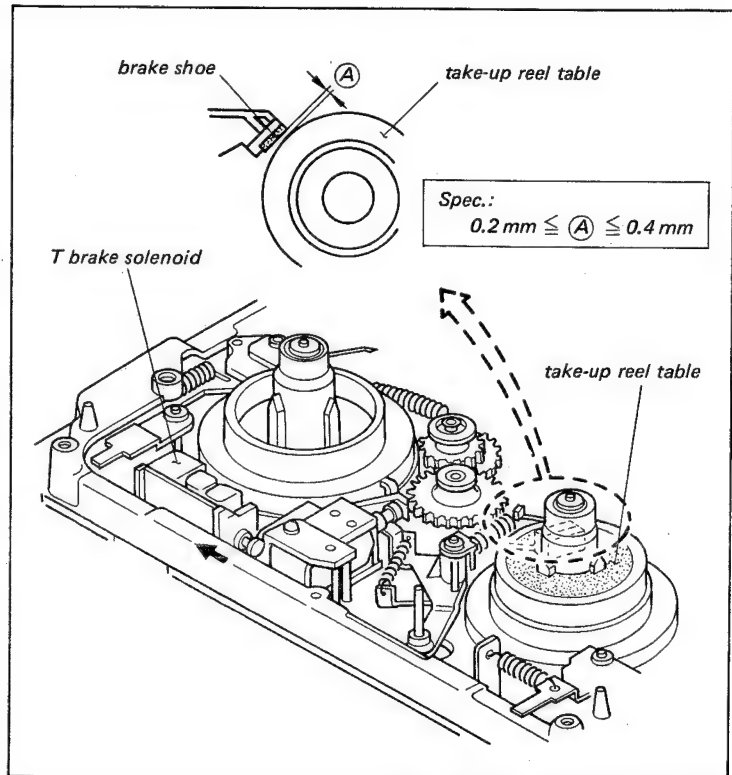
**Mode:** Unthreading end

**Check procedure:**

- (1) Push the iron core of the T brake solenoid into the fully energized position in the direction of the arrow.
- (2) Check that the clearance between the take-up reel table and the brake shoe meets the required specification.

**Adjustment procedure:**

- (1) Open the VA-16 and the SS-23 boards.
- (2) Loosen the two mounting screws of T brake solenoid from rear of the chassis and adjust the position of the T brake solenoid so that it meets the required specification.



#### 6-3-2. S Soft Brake Clearance Adjustment

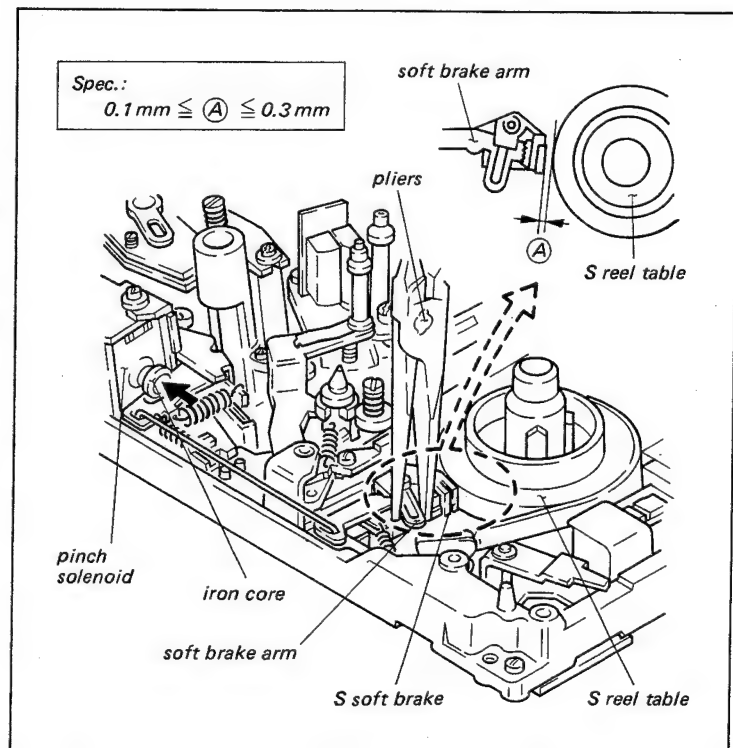
**Mode:** Unthreading end

**Check procedure:**

- (1) Push the iron core of the pinch solenoid into the fully energized position in the direction of the arrow.
- (2) Check that the clearance between the S reel table and the S soft brake meets the required specification.

**Adjustment procedure:**

- (1) Adjust the soft brake arm with pliers so that the required specification is met.



## 6-4. TENSION REGULATOR SYSTEM ADJUSTMENT

### 6-4-1. Tension Regulator Slantness Adjustment

.This adjustment is closely related with the video tracking adjustment.

.Perform the video tracking adjustment after this adjustment.

**Tool:** PB alignment checker

Cassette reference plate

Tension regulator slantness check tool

Alligator clip

**Mode:** Threading end

**Check procedure:**

- (1) Clip the tension regulator arm and the pin with the alligator clip as shown in figure.  
(Crush the tip of the alligator clip with pliers.)
- (2) Install the cassette reference plate.
- (3) Place the tension regulator slantness check tool against the tension regulator roller. Check that the slantness of the roller meets the required specification viewing from the direction of the arrows A and B as shown in figure.

**Adjustment procedure:**

.When the slantness is out of spec. viewing from the direction of the arrow B:

- (1) Adjust the slantness with the set screw.

.When the slantness is out of spec. viewing from the direction of the arrow A:

- (2) Adjust the slantness with the adjusting screw.

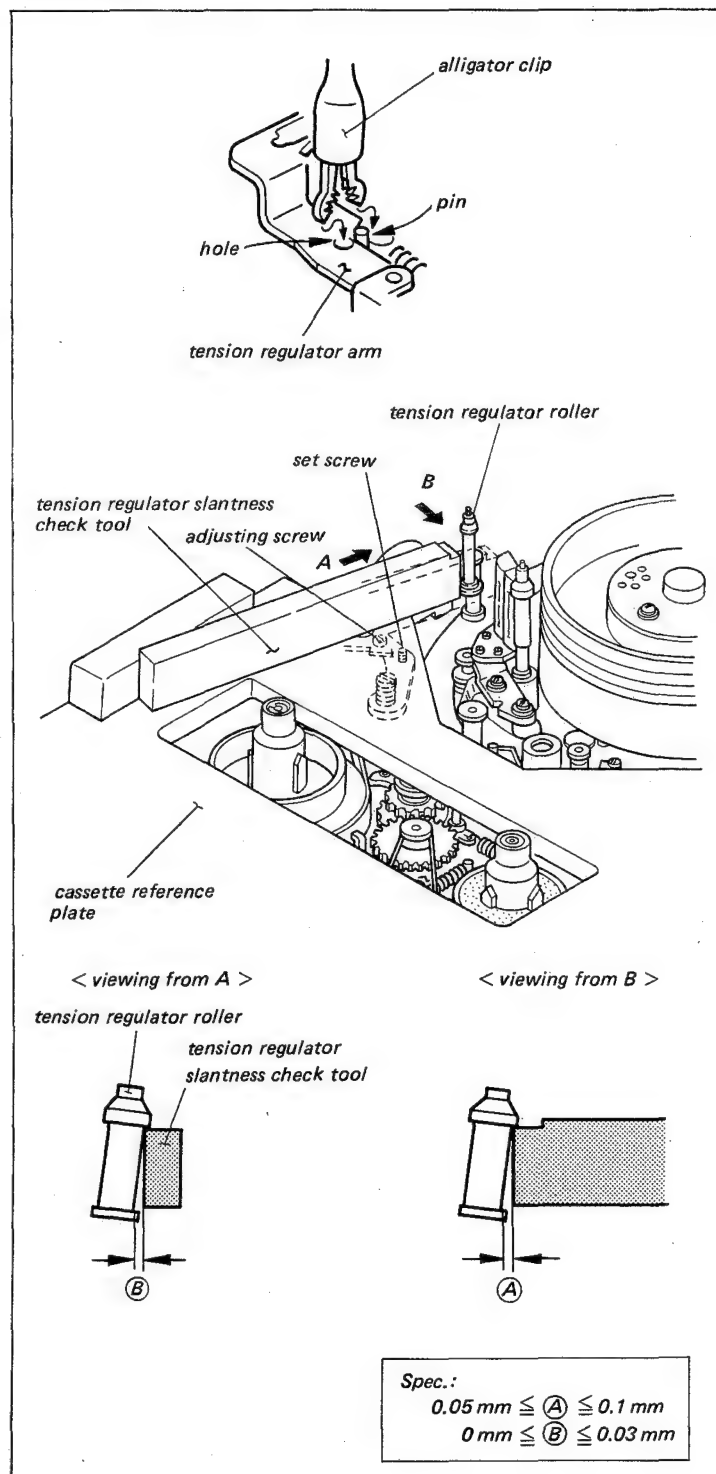
- (3) Confirm as check procedure (3).

- (4) After adjustment, perform the following adjustment;

Sec.6-4-2 Tension regulator operating position adjustment

Sec.6-5-1 Gear block position adjustment

Sec.6-4-3 Joint lever (2) position adjustment



#### 6-4-2. Tension Regulator Operating Position Adjustment

It is required that the sec. 6-4-1 Tension regulator slantness adjustment, and sec. 6-5-1 Gear block position adjustment are checked to be correct or properly adjusted before initiating this adjustment.

**Tool:** Slide vernier caliper or equivalent  
PB alignment checker

Alligator clip

**Mode:** Threading end

##### Check procedure:

- (1) Clip the tension regulator arm and the pin with the alligator clip as shown in figure.
- (2) Check that the distance between the flanges of the entrance guide and the tension regulator roller meets the required specification.

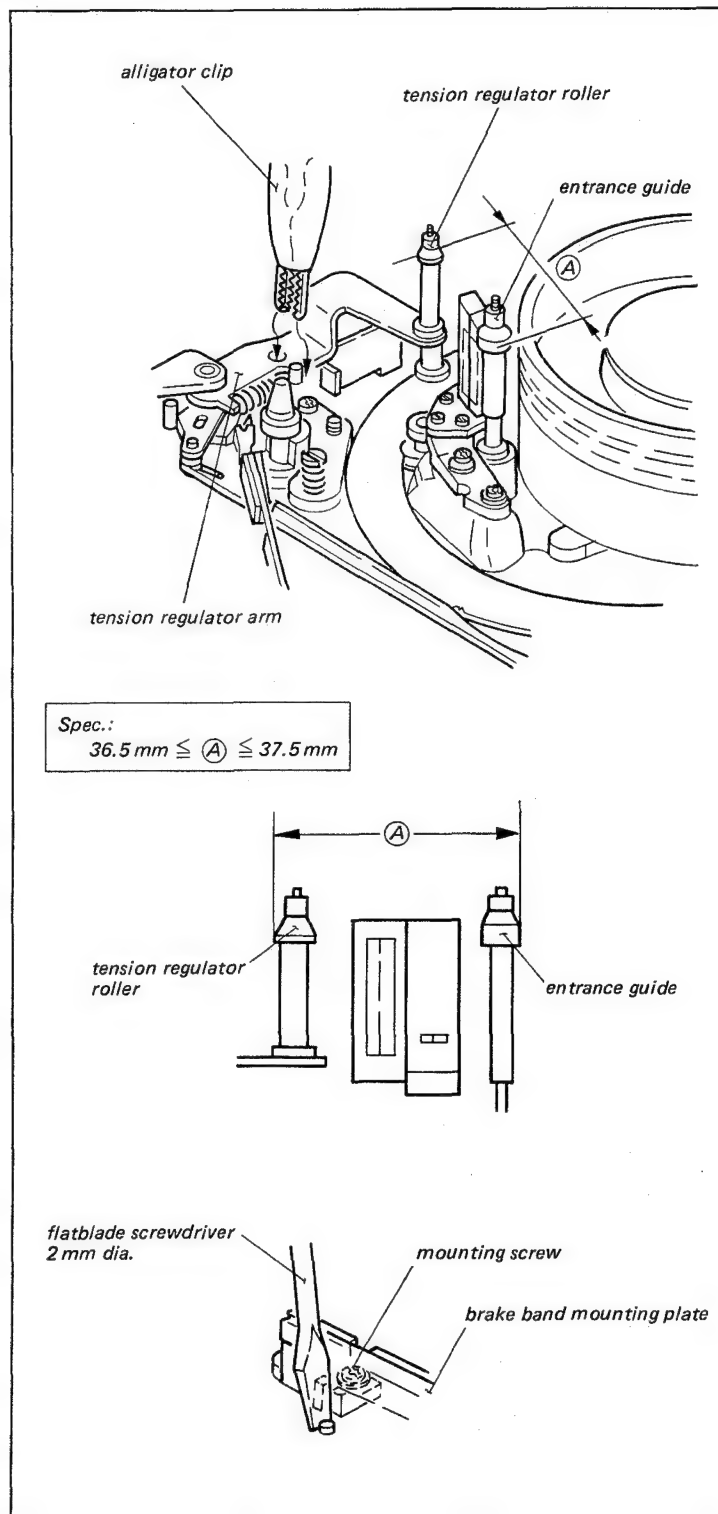
##### Adjustment procedure:

- (1) Loosen the mounting screw of the brake band mounting plate about 1/3 to 1 turn.
- (2) Adjust the position of the brake band mounting plate with a flatblade screw driver, 2mm dia. so that it meets the required specification.

- (3) After adjustment, perform the following adjustments;

Sec. 6-7 T coil sensor position adjustment

Sec. 6-4-3 Joint lever (2) position adjustment.



### 6-4-3. Joint Lever (2) Position Adjustment

It is required that the sec.6-4-1 Tension regulator slantness adjustment, sec.6-4-2 Tension regulator operating position adjustment, and sec.6-5-1 Gear block position adjustment are checked to be correct or properly adjusted before initiating this adjustment.

**Tool:** PB alignment checker

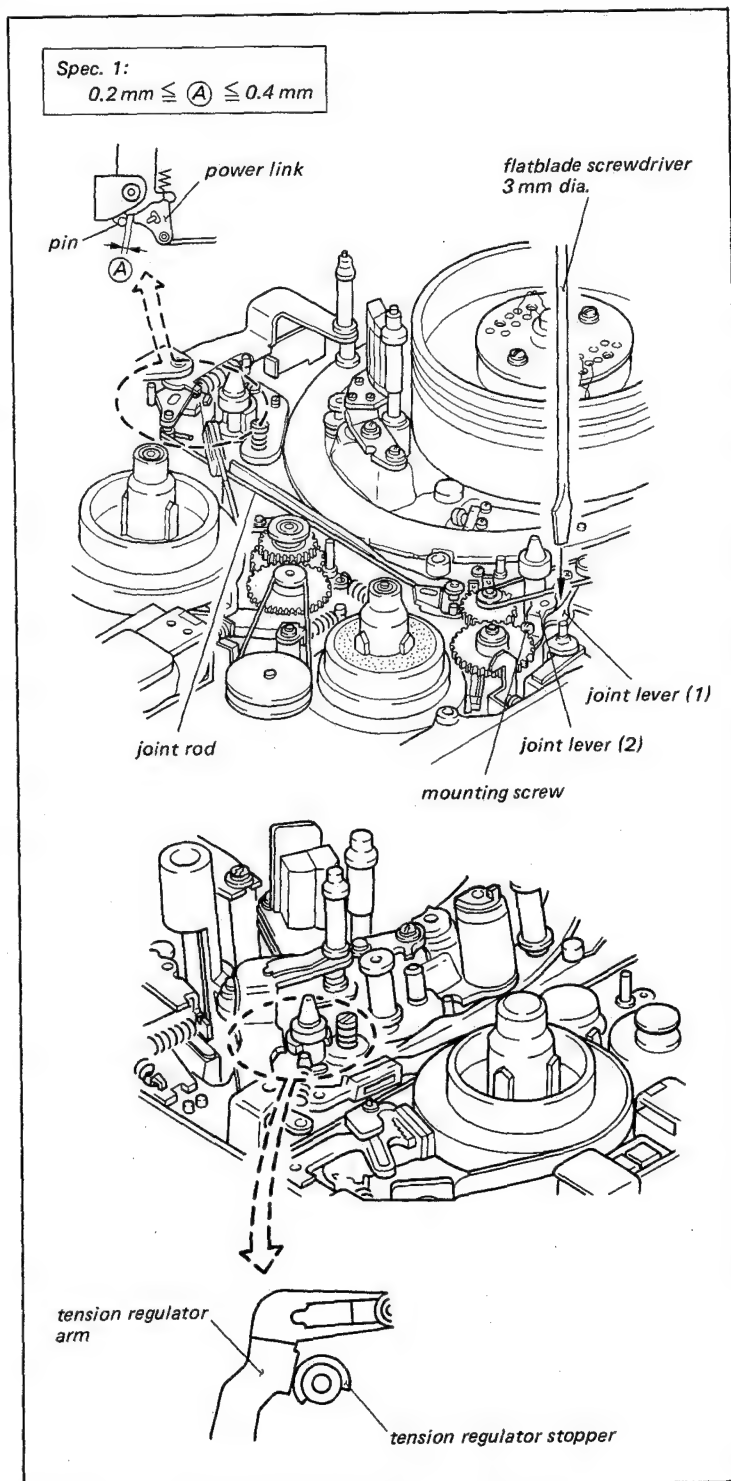
**Mode:** Threading end/Unthreading end

#### Check procedure:

- (1) Check the clearance between the power link and the pin so that it meets the required specification (1) in the threading end state.
- (2) Put the machine into the unthreading end state.
- (3) Check that the tension regulator arm is in contact with the tension regulator stopper. (Spec.2)

#### Adjustment procedure:

- (1) Loosen the mounting screw of the joint lever (2) about one or two turns.
- (2) Insert a flatblade screw driver, 3mm dia. between the joint lever (1) and (2). Adjust the position of the joint lever (2) so that it meets the required specification (1).
- (3) Check the spec.(2). If the spec.(2) is out of spec., adjust the position of the joint lever (2) within the limits of spec.(1).



## 6-5.THREADING SYSTEM ADJUSTMENT

### 6-5-1. Gear Block Position Adjustment

**Tool:** PB alignment checker

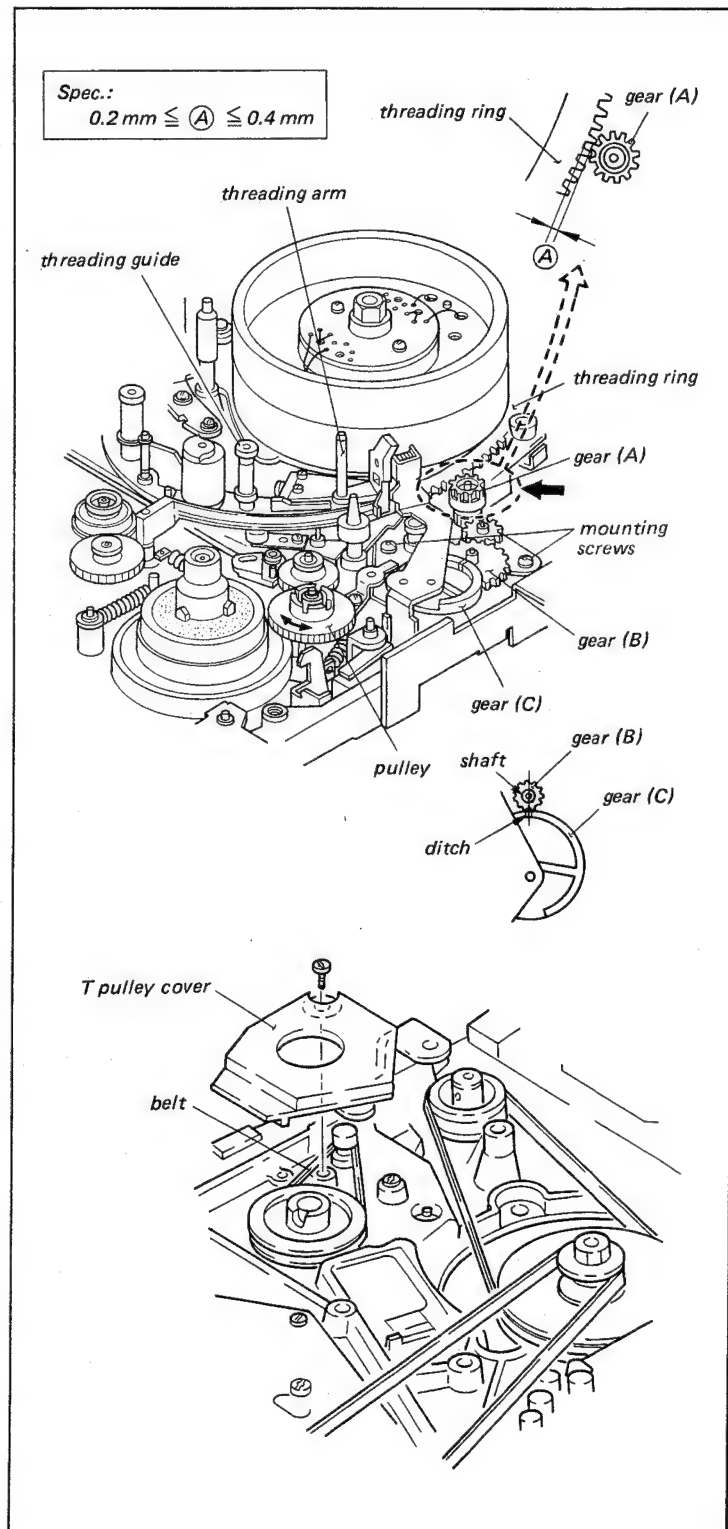
**Mode:** Unthreading end/Threading

**Check procedure:**

- (1) Put the machine into the unthreading end mode.
- (2) Check that the clearance between the gear (A) and threading ring meets the required specification.
- (3) Insert the cassette-tape.
- (4) Check that the threading arm does not hit against the threading guide in the threading mode.

**Adjustment procedure:**

- (1) Put the machine into the unthreading end mode.
- (2) Open the VA-16 and the SS-23 boards.
- (3) Remove the T pulley cover and the belt as shown in figure.
- (4) Loosen the mounting screws of the gear block, and disengage the gear from the threading ring.
- (5) Turn the pulley by hand so that it meets the positional relationship between the notch of gear (c) and the shaft of gear (B) as shown in figure.
- (6) Move the gear (A) in the direction of the arrow so that it meets the required specification.
- (7) Confirm as check procedures (3) and (4). When the threading arm hits against the threading guide, perform the following steps.
- (8) Perform adjustment procedures (1) to (5).
- (9) Disengage the gear (A) and the threading ring. Turn the gear (A) one tooth in clockwise direction and engage again.
- (10) Confirm as adjustment procedures (6) and (7).
- (11) After adjustment, perform the sec.6-4-3 Joint lever(2) position adjustment.





### 6-5-2. Ring Stopper B Height Adjustment

**Tool:** Inspection mirror

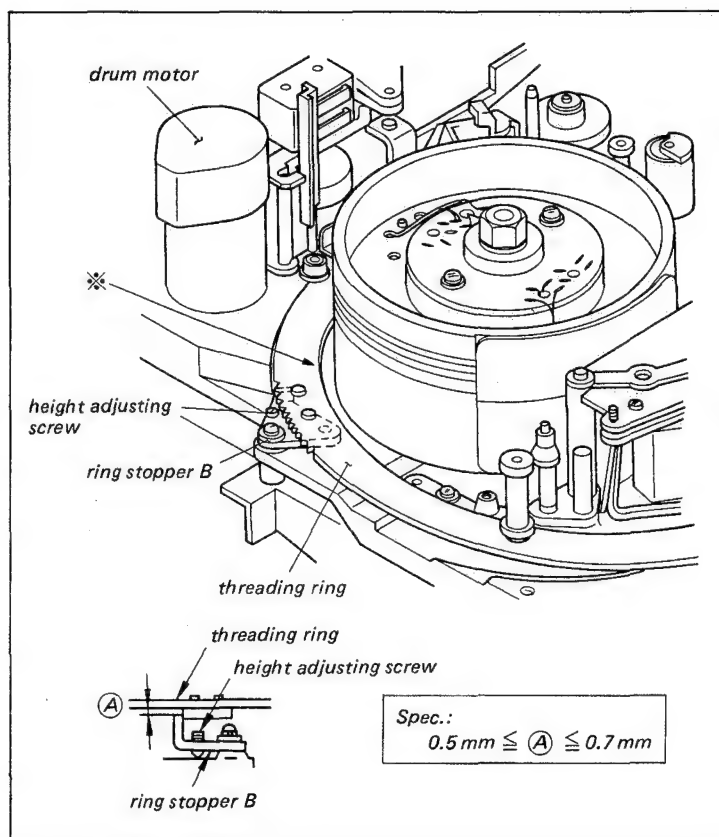
**Mode:** Unthreading end

**Check procedure:**

- (1) Remove the TR board.
- (2) Lift up the \* marked portion of the threading ring lightly. Check that the clearance between the threading ring and the ring stopper B meets the required specification with the inspection mirror.

**Adjustment procedure:**

- (1) Adjust the height adjusting screw of the ring stopper B so that meets the required specification.



### 6-5-3. Thread End Position Adjustment

**Tool:** PB alignment checker

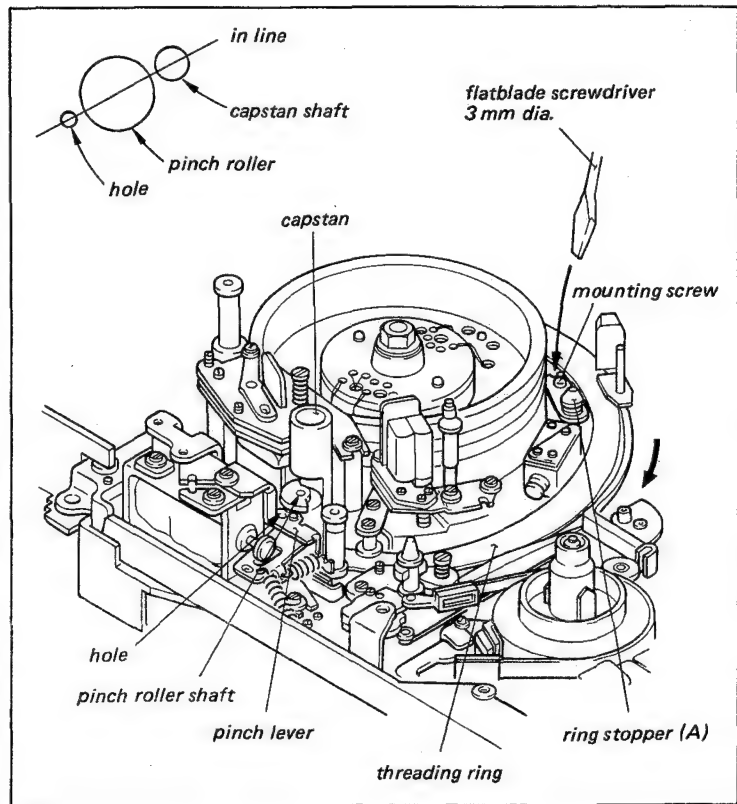
**Mode:** Threading end

**Check procedure:**

- (1) Put the machine into the threading end mode.
- (2) While pressing the threading ring in the direction of the arrow by hand, check that the center of pinch roller shaft is in line with the capstan shaft and the hole in the pinch lever as shown in figure.

**Adjustment procedure:**

- (1) Loosen the mounting screw of the ring stopper (A) about 1/4 to 1/2 turn.
- (2) Insert a flatblade screwdriver, 3mm dia. between the notch of ring stopper (A) and the boss. While pressing the threading ring in the direction of the arrow by hand, adjust the position of the ring stopper (A) so that it meets the required specification.
- (3) Repeat the unthreading and threading modes two or three times and check that the positional relationship meets the required specification.
- (4) After adjustment, perform the sec.6-5-4 Stopper arm B position adjustment.



#### 6-5-4. Stopper Arm B Position Adjustment

It is required that the sec.6-5-3. Thread end position adjustment is checked to be correct or properly adjusted before initiating this adjustment.

**Tool:** PB alignment checker

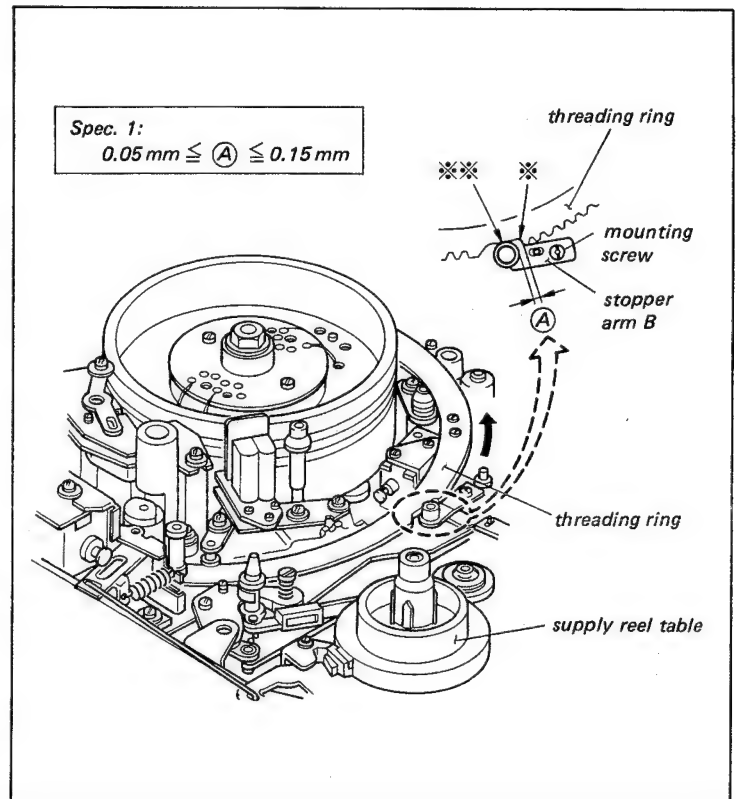
**Mode:** Threading end

##### Check procedure:

- (1) While pushing the threading ring in the direction of the arrow by hand, check that the clearance between \* marked portion of the threading ring and the roller of the stopper arm B meets the required specification (1).
- (2) Check that the roller of the stopper arm B contacts with the \*\* marked portion of the threading ring (spec.2).

##### Adjustment procedure:

- (1) While pushing the threading ring in the direction of the arrow by hand, adjust the position of the stopper arm B so that meets the required specifications (1) and (2).
- (2) Repeat the unthreading and the threading modes two or three times and check to meet the required specifications (1) and (2).



#### 6-5-5. Thread End Switch Position Adjustment

It is required that the sec. 6-5-4 Stopper arm B position adjustment is checked to be correct or properly adjusted before initiating this adjustment.

**Tool:** Circuit tester

PB alignment checker

Thickness gauge

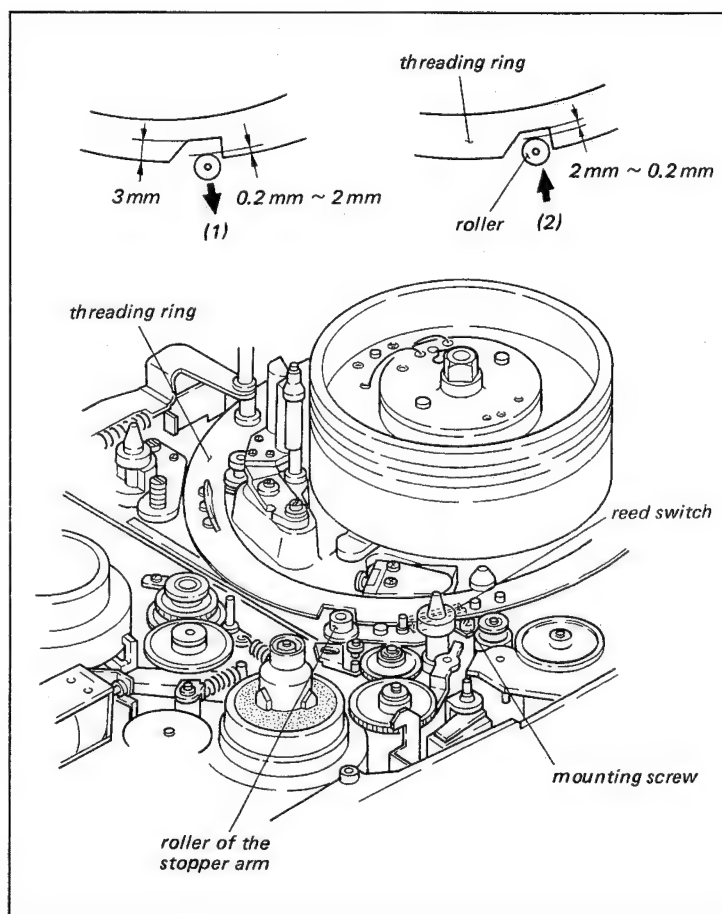
**Mode:** Threading end

##### Check procedure:

- (1) Open the VA-16 board.
- (2) Connect the circuit tester to the IC104 pin4 on SS-23 board.
- (3) Turn the power on. Check that the circuit tester indicates 5V.
- (4) Move the roller of the stopper arm in the direction of the arrow(1). Check that the circuit tester indicate 0V when the roller is placed between 0.2mm to 2mm from the outer circumference of the threading ring. (Spec.1)
- (5) Move the roller of the stopper arm in the direction of the arrow (2). Check that the circuit tester indicate 5V when the roller is placed between 2mm to 0.2mm from the indented portion of the threading ring.(Spec.2)

##### Adjustment procedure:

- (1) Loosen the screw as shown in figure and adjust the position of the reed switch.



## 6-6. PINCH PRESS MECHANISM ADJUSTMENT

### 6-6-1. Pinch Solenoid Position Adjustment

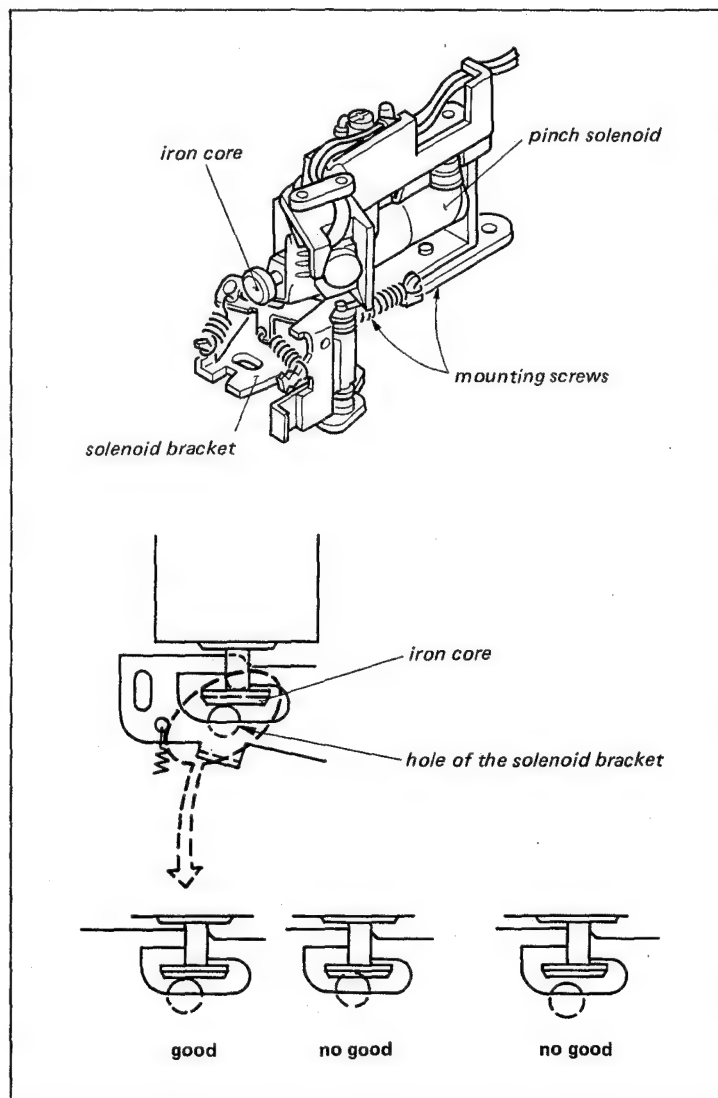
This adjustment is usually not required. Proceed with the following step only when the pinch solenoid is replaced or removed. Remove the pinch press mechanism from the set in this adjustment.

#### Check procedure:

- (1) Push the iron core of the pinch solenoid into the fully energized position with finger.
- (2) Check that the positional relationship between the top of the iron core and the hole of the solenoid bracket meets the required specification as shown in figure.

#### Adjustment procedure:

- (1) Loosen the mounting screws of the pinch solenoid and adjust the position of the solenoid so that meets the required specification.
- (2) After adjustment, perform the following adjustment;  
Sec.6-6 All of the pinch press mechanism adjustments  
Sec.8-1-1 Tape run adjustment (around the pinch roller).



## 6-6-2. Pinch Pressure Adjustment

.Remove the pinch press mechanism from the set in this adjustment.

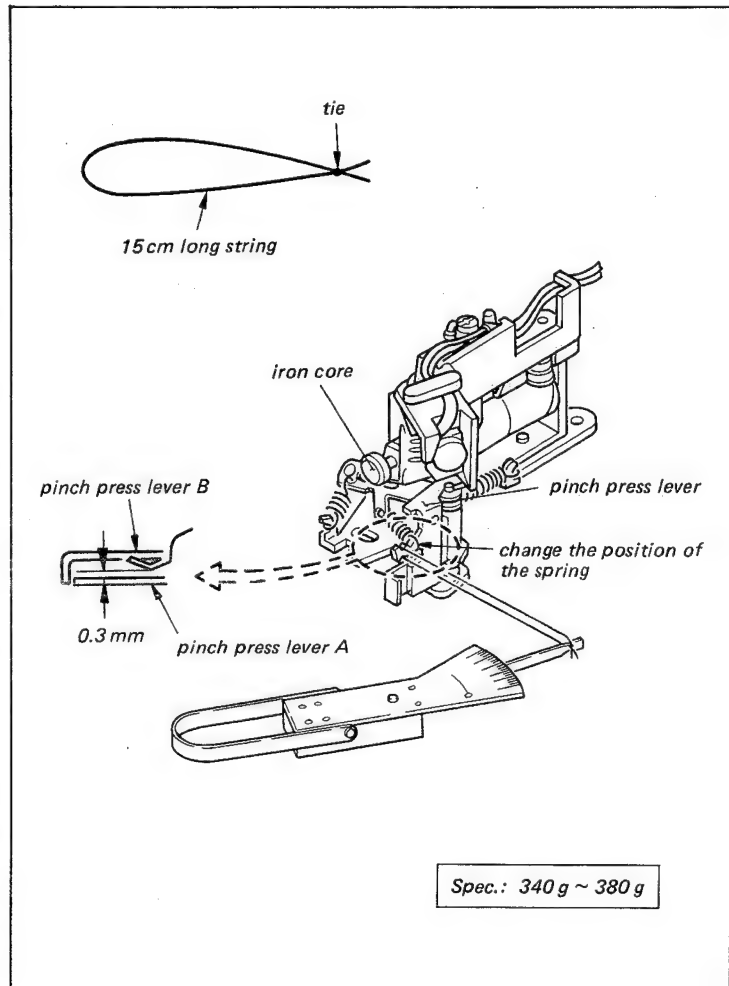
**Tool:** String for measurement(Make a loop about 15cm long as shown in figure.)  
Tension scale (500g full scale)

### Check procedure:

- (1) Hook the string on the pinch press lever as shown in figure and hook a tension scale on an end of the string.
- (2) While pressing the iron core of the pinch solenoid into the energized position with finger, move the tension scale in the right angle direction of the pinch press lever.
- (3) Move the tension scale so that the clearance between the pinch press lever A and B is about 0.5mm (visual check) and return the tension scale slowly. When the clearance is about 0.3mm (visual check) check that the scale reading meets the required specification.

### Adjustment procedure:

- (1) Change the position of the spring as shown in figure so that it meets the required specification.
- (2) After adjustment, perform the following adjustments;  
Sec. 6-6-5 Pinch press mechanism block position adjustment  
Sec. 8-1-1 Tape run adjustment (around the pinch roller).



### 6-6-3. Pinch Press Lever B Position Adjustment

This adjustment is required only when the pinch solenoid and the pinch press lever B are replaced or removed. Remove the pinch press mechanism from the set in this adjustment.

#### Check procedure:

- (1) Check that the clearance between the iron core of the pinch solenoid and the pinch press lever B meets the required specification.
- (2) When press the A portion of the pinch press lever in the direction of the arrow as far as it will go, check that this operation is smooth.

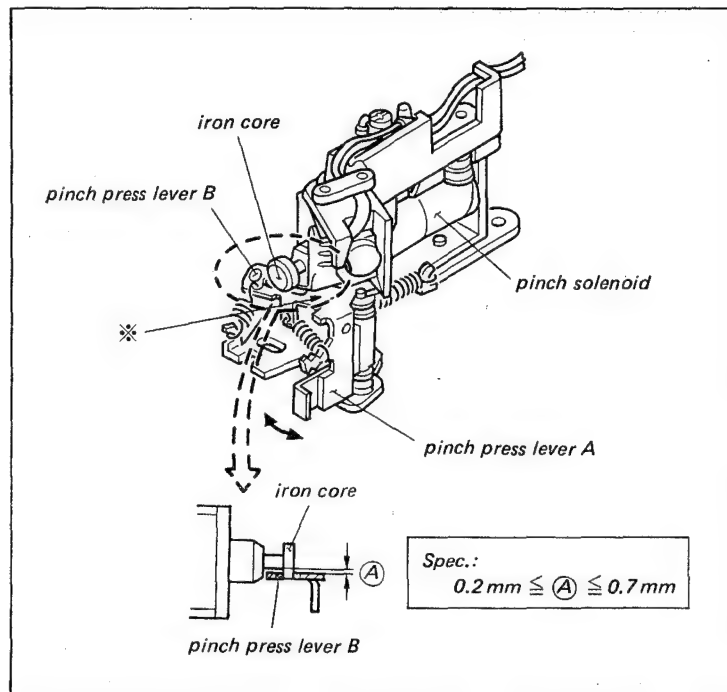
#### Adjustment procedure:

- (1) Bend the \* marked portion of the pinch press lever B with pliers so that meets the required specification.

- (2) After adjustment, perform the following adjustments;

Sec. 6-6-5 Pinch press mechanism block position adjustment

Sec. 8-1-1 Tape run adjustment (around the pinch roller).

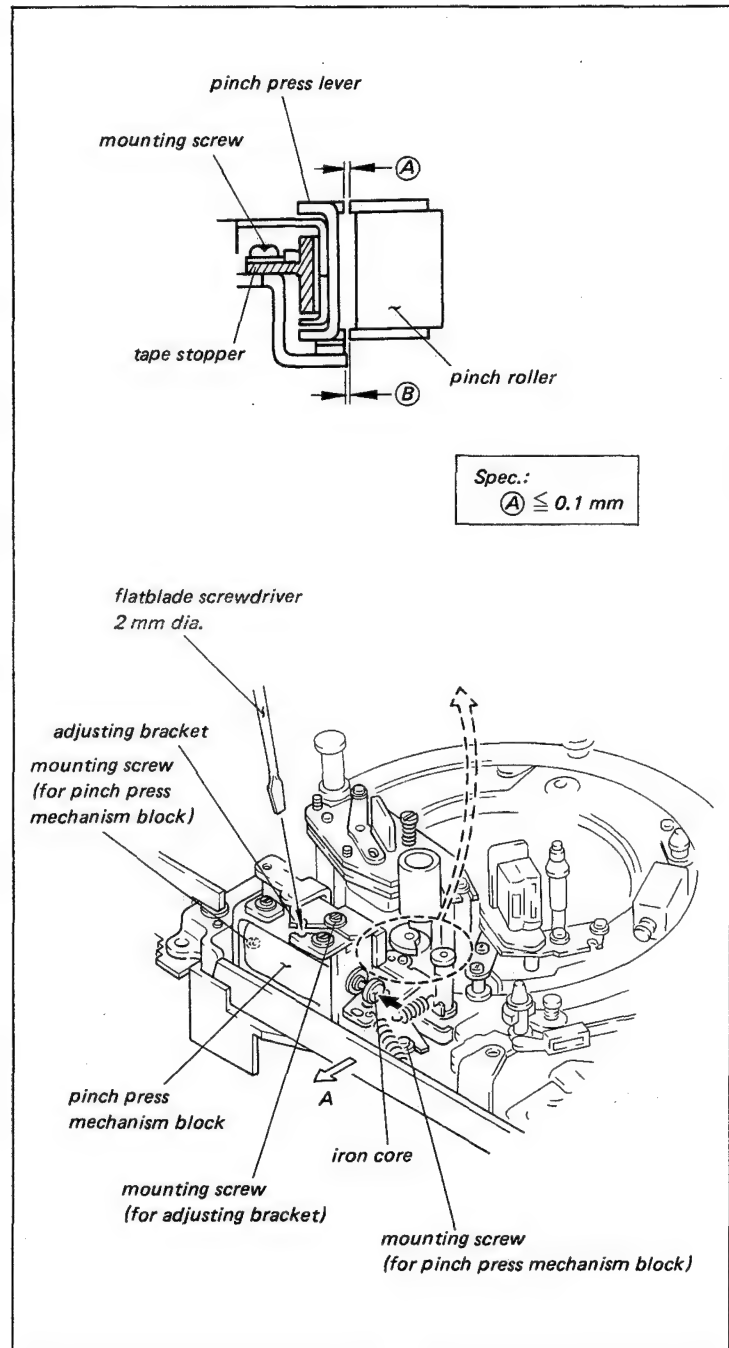


#### 6-6-4 (i). PINCH PRESSURE LEVER SLANTNESS ADJUSTMENT

**Mode:** Threading end

##### **Adjustment procedure:**

- (1) Loosen the two mounting screws of the pinch press mechanism block.
- (2) Move the pinch press mechanism block in the direction of the arrow A, then tighten the pinch press mechanism block with two screws.
- (3) Loosen the mounting screw of the tape stopper about 1/2 to 1 turn.
- (4) Loosen the mounting screw of the adjusting bracket about 1/4 to 1/2 turn.
- (5) Push the iron core of the pinch solenoid into the fully energized position in the direction of the arrow.
- (6) Insert a flatblade screwdriver, 2mm dia. into the notch of the adjusting bracket. Adjust the position of the adjusting bracket so that the clearance between the upper and lower flanges of the pinch roller and the pinch press lever to meet the required specification.
- (7) After adjustment, perform the sec. (ii) Tape stopper position adjustment.





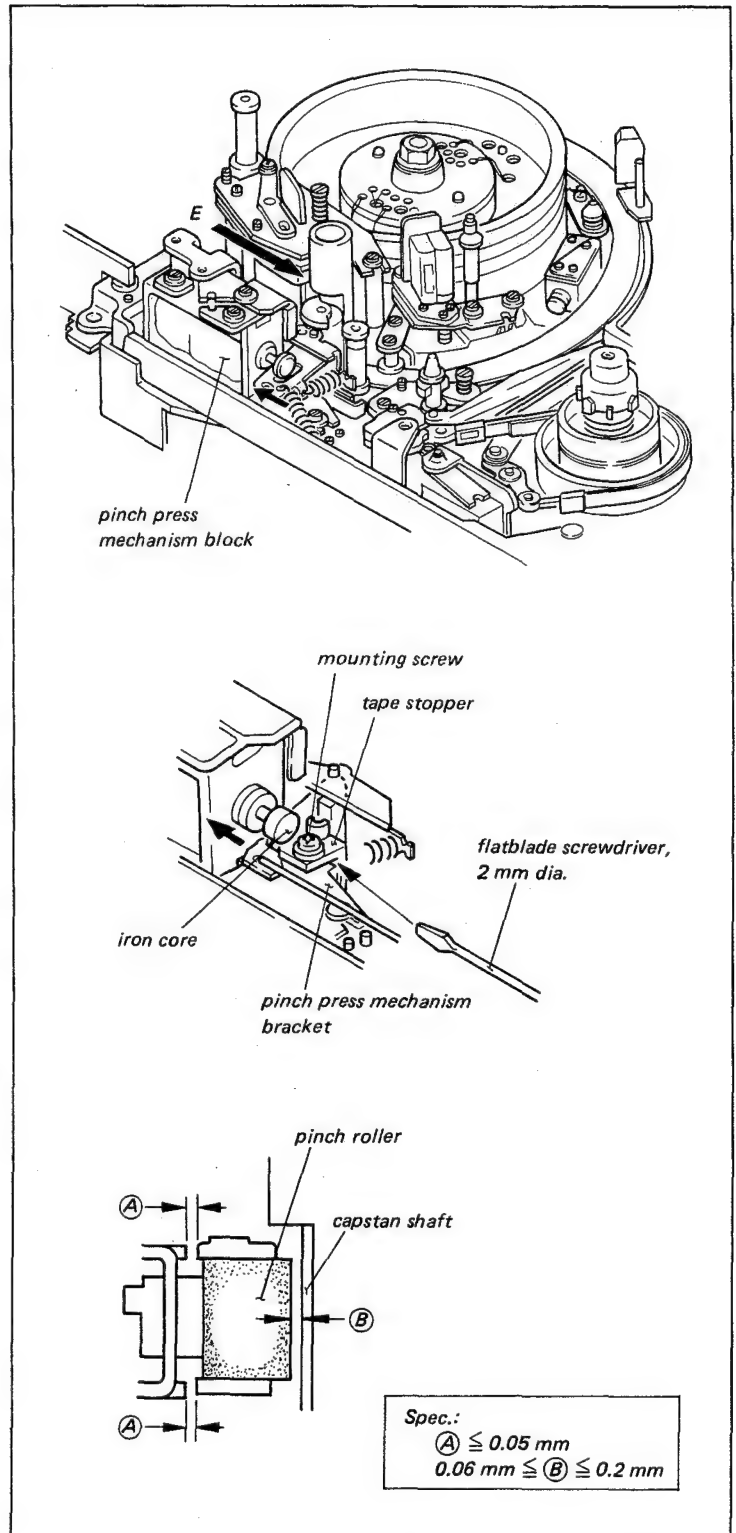
#### 6-6-4 (ii). TAPE STOPPER POSITION ADJUSTMENT

It is required that the sec. (i) Pinch pressure lever slantness adjustment is checked to be correct or properly adjusted before initiating this adjustment.

**Mode:** Threading end

##### Adjustment procedure:

- (1) Insert a flatblade screwdriver, 2mm dia. or equivalent between the pinch press mechanism bracket and the tape stopper on the pinch press mechanism block.
- (2) Adjust the position of the tape stopper with flatblade screwdriver in step 1 so that meets the clearance between the pinch roller and the capstan shaft, when viewing from the direction of the arrow E.
- (3) Push the iron core of the pinch solenoid into the fully energized position in the direction of the arrow.
- (4) Tighten the mounting screw of the tape stopper.
- (5) Pull out the iron core of the pinch solenoid from the energized position in the opposite direction of the arrow.
- (6) Check that the clearance B meets the required specification.
- (7) Check that the clearance A meets the required specification.
- (8) After adjustment, perform sec.6-6-5 Pinch press mechanism block position adjustment.



#### 6-6-5. Pinch Press Mechanism Block Position Adjustment

**Tool:** PB alignment checker

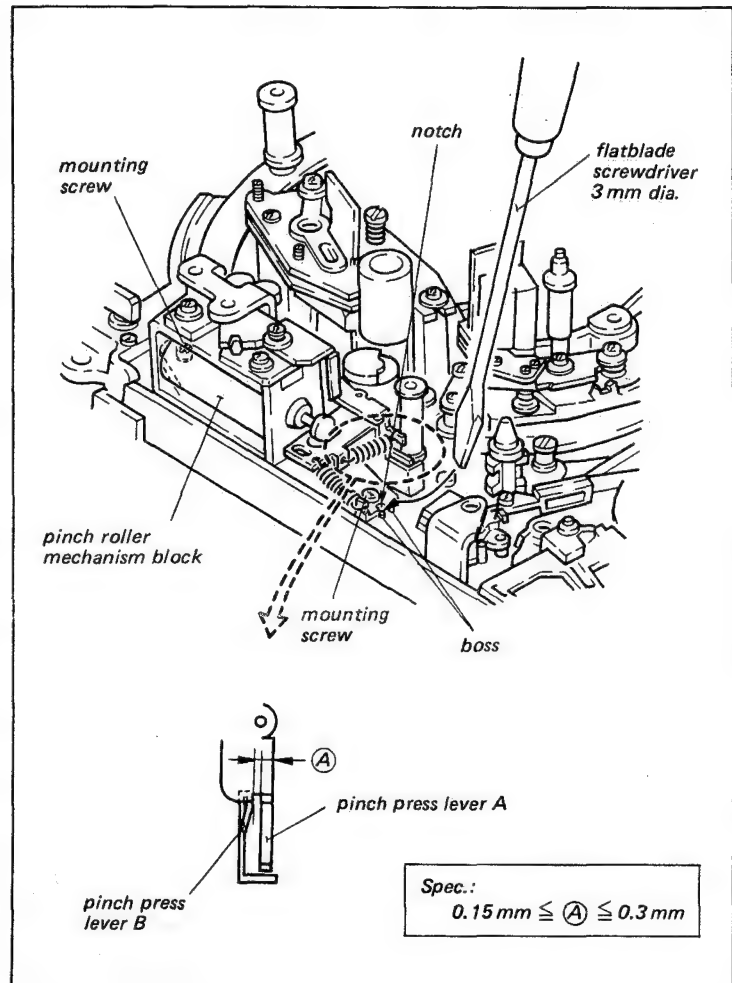
**Mode:** PLAY mode without cassette tape

**Check procedure:**

- (1) Put the machine into the PLAY mode without cassette tape.
- (2) Check that the clearance between the pinch press lever A and B meets the required specification.
- (3) Repeat the unthreading and the threading completion modes (PLAY mode) two or three times and check to meet the required specification.

**Adjustment procedure:**

- (1) Loosen the two mounting screws of the pinch press mechanism block about 1/4 to 1/2 turn.
- (2) Adjust the position of the pinch press mechanism block by the flatblade screwdriver, 3mm dia. so that it meets the required specification.



### 6-6-6. Pinch Press Lever Height Adjustment

**Tool:** PB alignment checker

**Mode:** Threading end

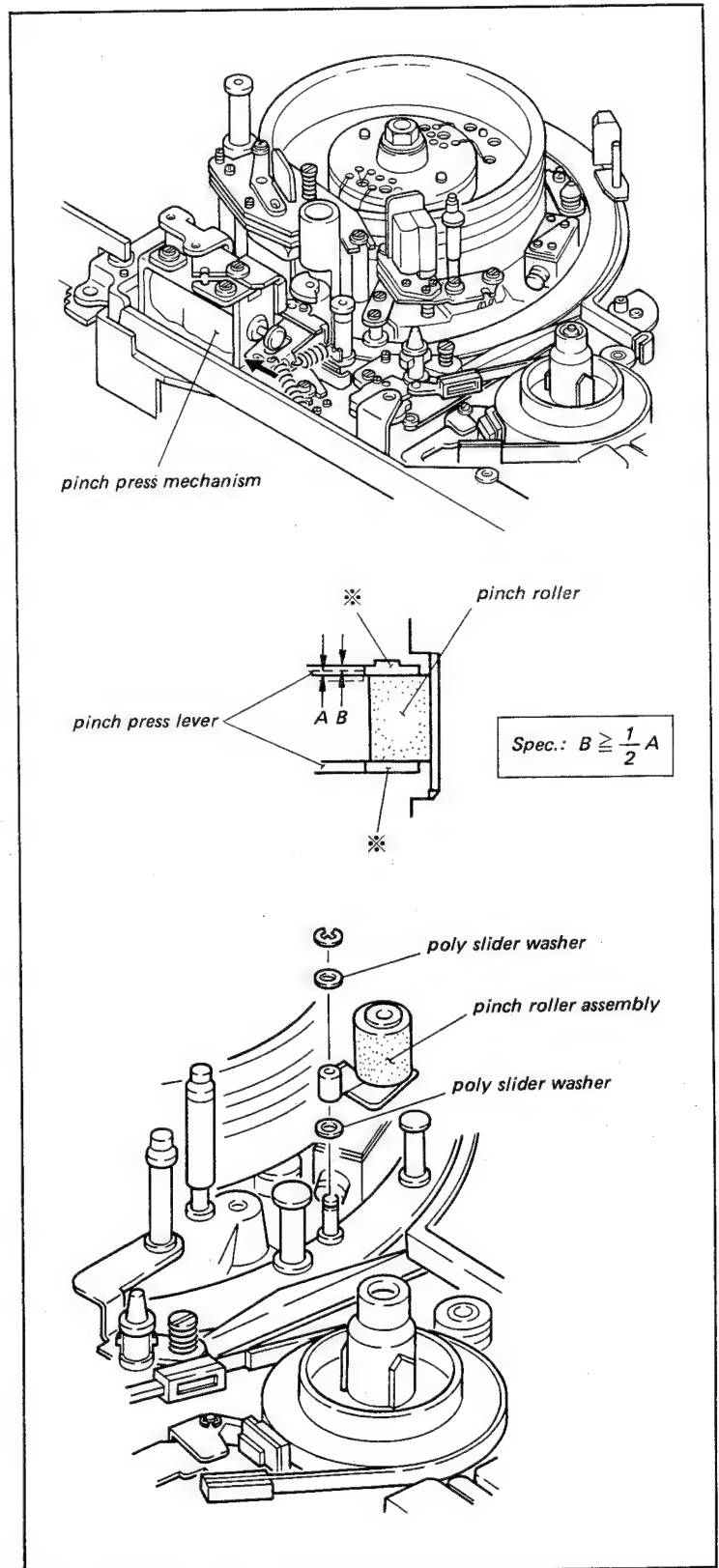
**Check procedure:**

- (1) Press the iron core of the pinch solenoid in the direction of the arrow slowly.

Check that the top and bottom plates of the pinch press lever press the \* marked portion of the pinch roller. Check that the positional relationship between the lever and the \* marked portion of the pinch roller meets the required specification.

**Adjustment procedure:**

- (1) Replace the poly-slider washer under the pinch roller ass'y so that it meets the required specification.
- (2) After replacement, check the vertical play of the pinch roller as sec. 5 so that it meets the required specification.



## 6-7. T COIL SENSOR POSITION ADJUSTMENT

**Tool:** PB alignment checker

Cassette tape without lid

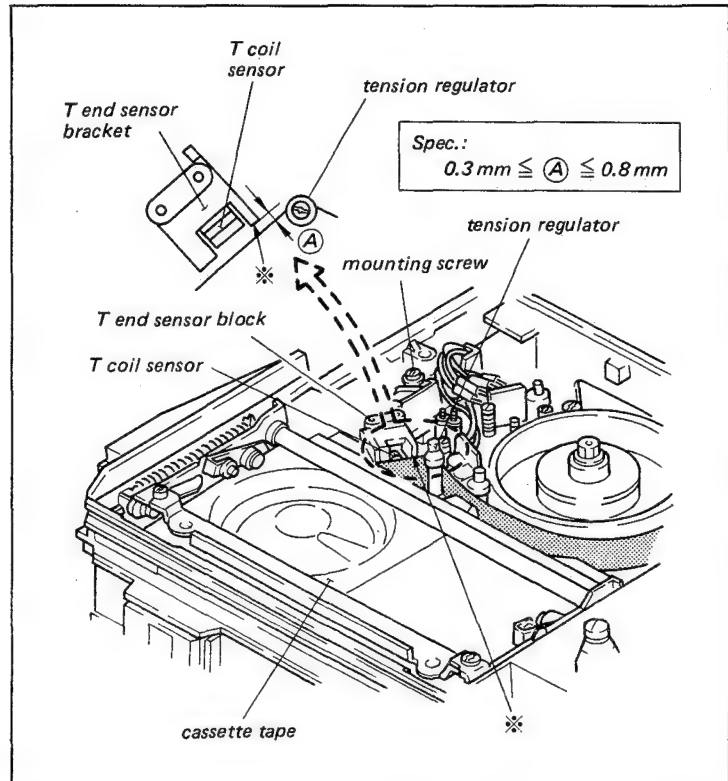
**Mode:** PLAY

### Check procedure:

- (1) Insert the cassette tape (use the beginning portion of the tape) and into the playback mode.
- (2) Check that the clearance between the tape and the \* marked portion of the T coil sensor meets the required specification.

### Adjustment procedure:

- (1) Adjust the position of the T end sensor bracket so that it meets the required specification.



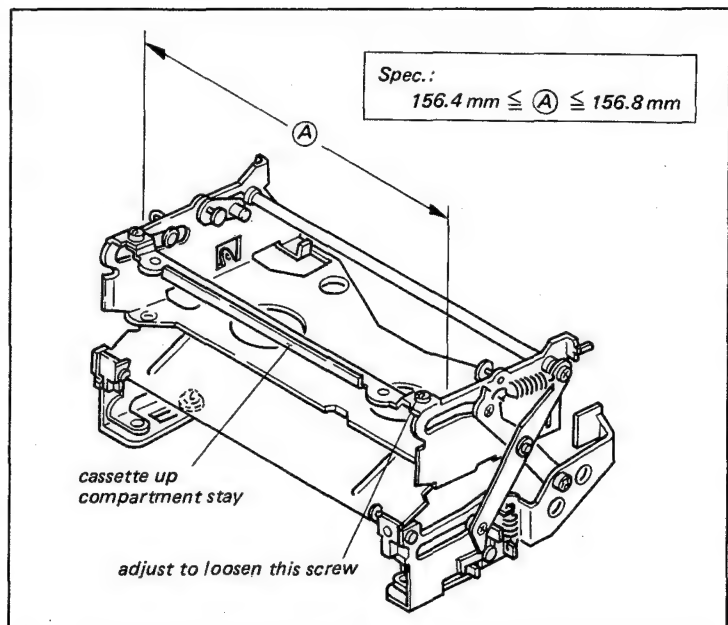
## 6-8. CASSETTE UP COMPARTMENT STAY MOUNTING POSITION ADJUSTMENT

This adjustment is usually not required. Proceed with the following step only when the cassette up compartment stay is replaced or removed.

**Tool:** Slide vernier caliper or equivalent

### Adjustment procedure:

- (1) Tighten the left side screw of the stay.
- (2) Tighten the right side screw of the stay so that meets the required specification.



## SECTION 7

# TORQUE AND BACK TENSION ALIGNMENT

### ALIGNMENT INFORMATION

#### MODE

##### . Unthreading end mode

It means EJECT completion mode.

The threading guide, tension regulator arm and threading ring are put back at the cassette tape side completely.

##### . Threading end mode

- (1) Connect the Head Amp. block of PB alignment checker to VTR.
- (2) Turn the SAVE/STANDBY switch of checker into STANDBY.
- (3) Keep pushing the cassette in shaft till the threading ring rotation is stopped.

This state means the threading end mode.

##### . Threading mode

- (1) Connect the Head Amp. block of the PB alignment checker to VTR.
- (2) Turn the SAVE/STANDBY switch of checker into STANDBY.
- (3) Push the cassette in shaft and rotate the threading ring. Threading mode means that this threading ring is rotating.

##### . PLAY mode without cassette tape

- (1) Connect the Head Amp. block of the PB alignment checker to VTR.
- (2) Turn the SAVE/STANDBY switch of checker into STANDBY.
- (3) Keep pressing the cassette in shaft till the threading ring rotation is stopped.
- (4) Turn the START/STOP switch of checker into START. This state means the PLAY mode without cassette tape.

##### . PLAY mode

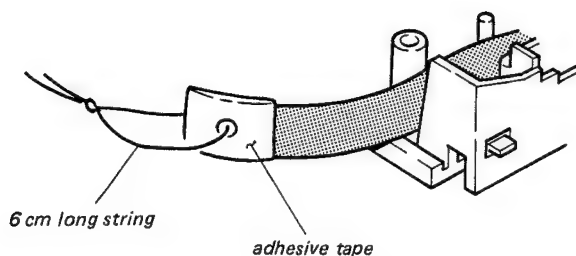
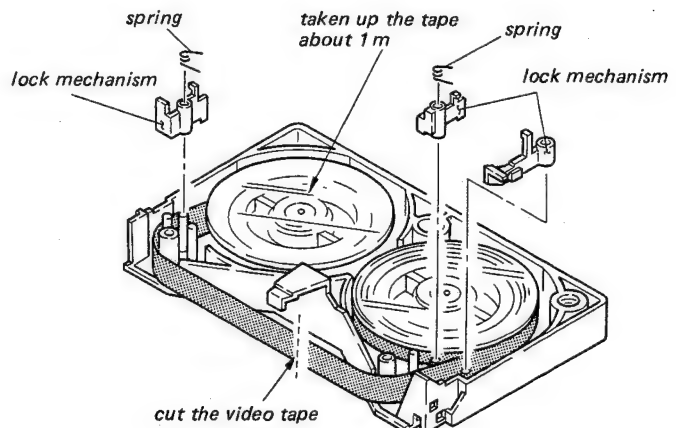
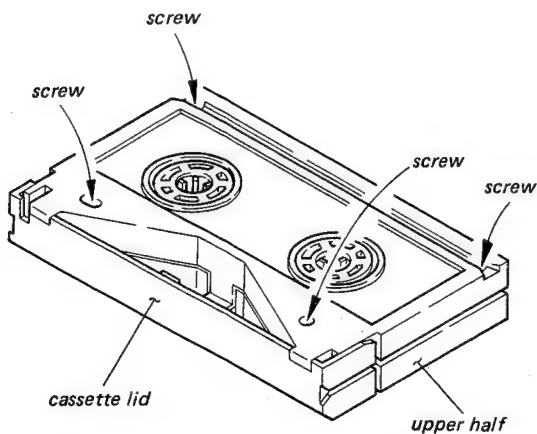
- (1) Connect the Head Amp. block of the PB alignment tape to VTR.
- (2) Insert a cassette tape into VTR.
- (3) Turn the SAVE/STANDBY switch of checker into STANDBY. (Threading starts)
- (4) Turn the START/STOP switch of checker into START.  
This state means the PLAY mode.

## HOW TO MAKE THE LOCALLY-SPECIALLY-MADE-TAPE

This tape is used for the FWD back tension adjustment. Prepare this tape as follows:

- (1) Wind the L-500 cassette tape to the tape beginning portion.
- (2) Remove the four screws on back of the cassette tape, and remove the upper half of the cassette.
- (3) Remove the lock mechanism parts and the springs on the left and right.
- (4) Remove the cassette lid from the upper half.
- (5) Taken up the video tape on the take-up reel about 1 meter. Cut the video tape at the position as shown in figure. Remove the take-up reel from the cassette. (The take-up reel is used for torque measurement as a locally-specially-made-reel.)
- (6) Attach an adhesive tape on an end of the tape at the supply side and make a hole on the adhesive tape.
- (7) Make a loop of 6cm long string through the hole.
- (8) Install the upper half on the lower half with four screws from the back side.

< locally-specially-made-tape >

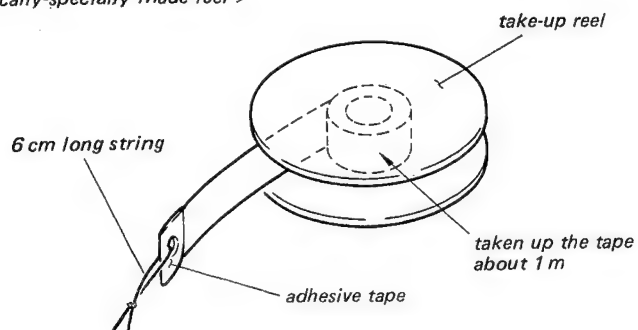


### HOW TO MAKE THE LOCALLY-SPECIALLY-MADE-REEL

This is used for the torque measurement. This reel is the take-up reel that is removed in "locally-specially-made-tape".

- (1) Remove the take-up reel referring the step (5) "How to make the locally-specially-made-tape".
- (2) Attach an adhesive tape on an end of the tape at the take-up side and make a hole on the adhesive tape.
- (3) Make a loop of 6cm long string through the hole.

< locally-specially-made-reel >



## 7-1. S SOFT BRAKE TORQUE ADJUSTMENT

**Tool:** Locally-specially-made-reel  
(Refer to alignment information.)  
Tension scale (50g full scale)

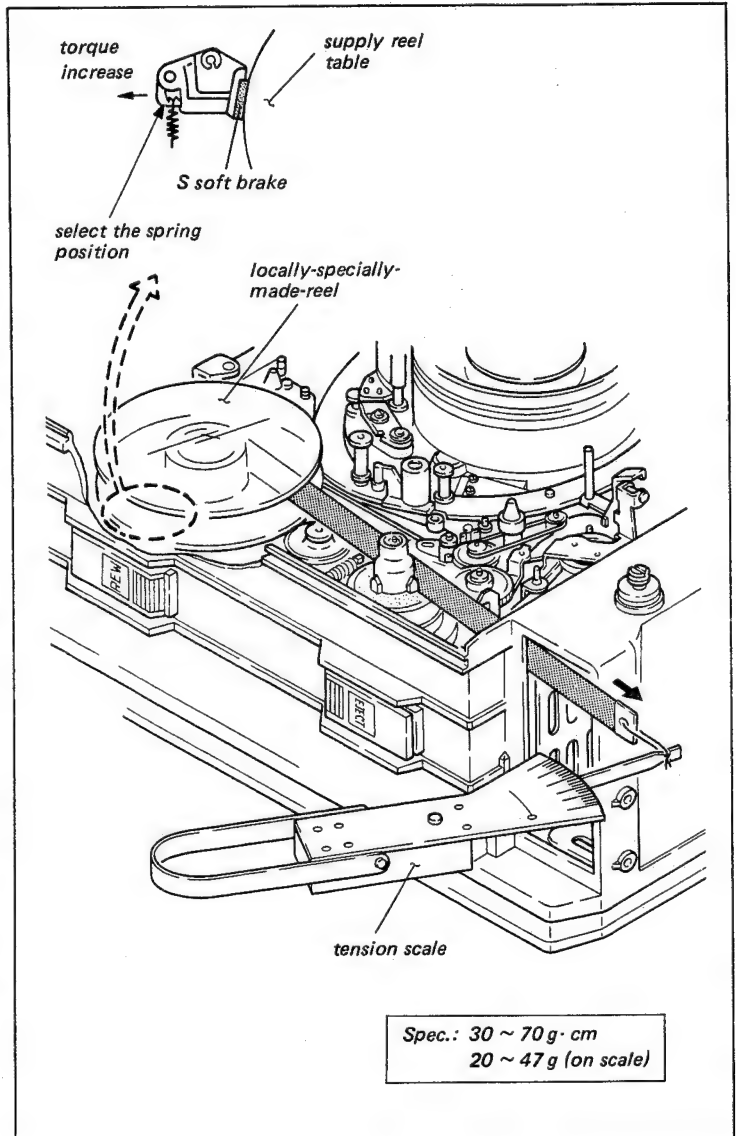
**Mode:** Unthreading end

**Check procedure:**

- (1) Wind the tape of the locally-specially-made-reel to the clockwise direction.
- (2) Open the lid of the battery case. If battery is in the case, remove it.
- (3) Install the locally-specially-made-reel on the supply reel table and thread the tape through between the battery case and the cabinet.
- (4) Hook a tension scale on an end of the tape.
- (5) Pull out the tape at the constant speed of approx. 12cm/sec. in the direction of the arrow. Check that the scale reading meets the required specification.

**Adjustment procedure:**

- (1) Clean the matching surface of the S soft brake on the supply reel table with a cloth moistened with cleaning fluid.
- (2) Select the spring position of the S soft brake so that meets the required specification.





## 7-2. T SOFT BRAKE TORQUE ADJUSTMENT

**Tool:** Loccally-specially-made-reel  
(Refer to alignment information.)  
Tension scale (20g full scale)

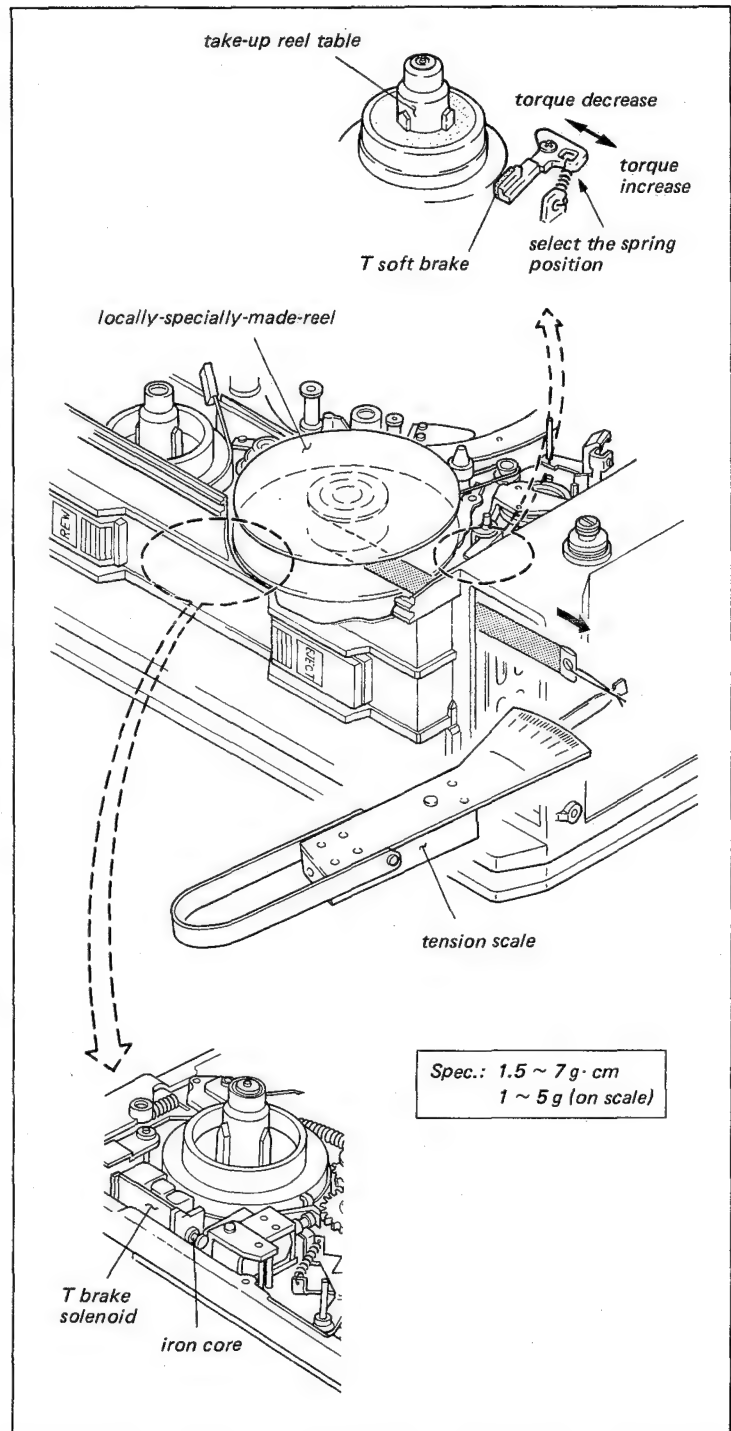
**Mode:** Unthreading end

### Check procedure:

- (1) Wind the tape of the locally-specially-made-reel to the counterclockwise direction.
- (2) Open the lid of the battery case. If battery is in the case, remove it.
- (3) Install the locally-specially-made-reel on the take-up reel table. Thread the tape through between the battery case and the cabinet as shown in figure.
- (4) Hook a tension scale on an end of the tape.
- (5) While pushing the iron core of the T brake solenoid into the energized position with finger, pull out the the tension scale at the constant speed of approx. 12cm/sec. in the direction of the arrow. Check that the scale reading meets the required specification.

### Adjustment procedure:

- (1) Clean the matching surface of the T soft brake on the take-up reel table with a cloth moistened with cleaning fluid.
- (2) Select the spring position of the T soft brake so that meets the required specification.



### 7-3. T MAIN BRAKE TORQUE ADJUSTMENT

**Tool:** Locally-specially-made-reel  
(Refer to alignment information.)  
Tension scale (200g full scale)

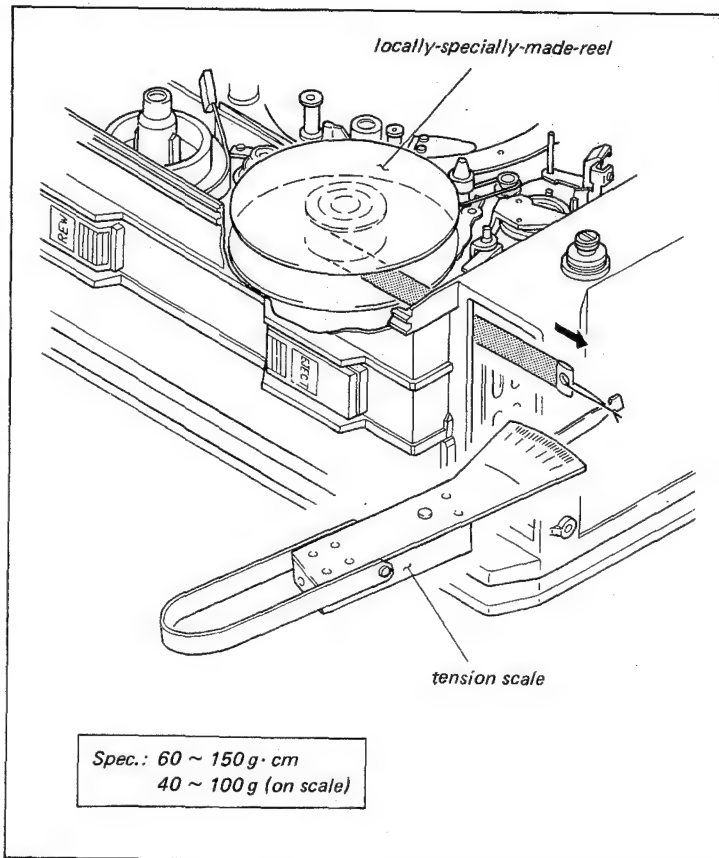
**Mode:** Unthreading end

**Check procedure:**

- (1) Wind the tape of the locally-specially-made-reel to the counterclockwise direction.
- (2) Open the lid of the battery case. If battery is in the case, remove it.
- (3) Install the locally-specially-made-reel on the take-up reel table and thread the tape through between the battery case and the cabinet.
- (4) Hook a tension scale on an end of the tape.
- (5) Pull out the tension scale at the constant speed of approx. 12cm/sec. in the direction of the arrow. Check that the scale reading meets the required specification.

**Adjustment procedure:**

- (1) Clean the matching surface of the T main brake on the take-up reel table with a cloth moistened with cleaning fluid.
- (2) Perform the check procedure. If does not meet the specification, replace the brake.
- (3) After replacement, check again.



#### 7-4. FWD BACK TENSION ADJUSTMENT

**Mode:** Threading end

**Tool and equipment:**

Tension scale

Locally-specially-made-tape

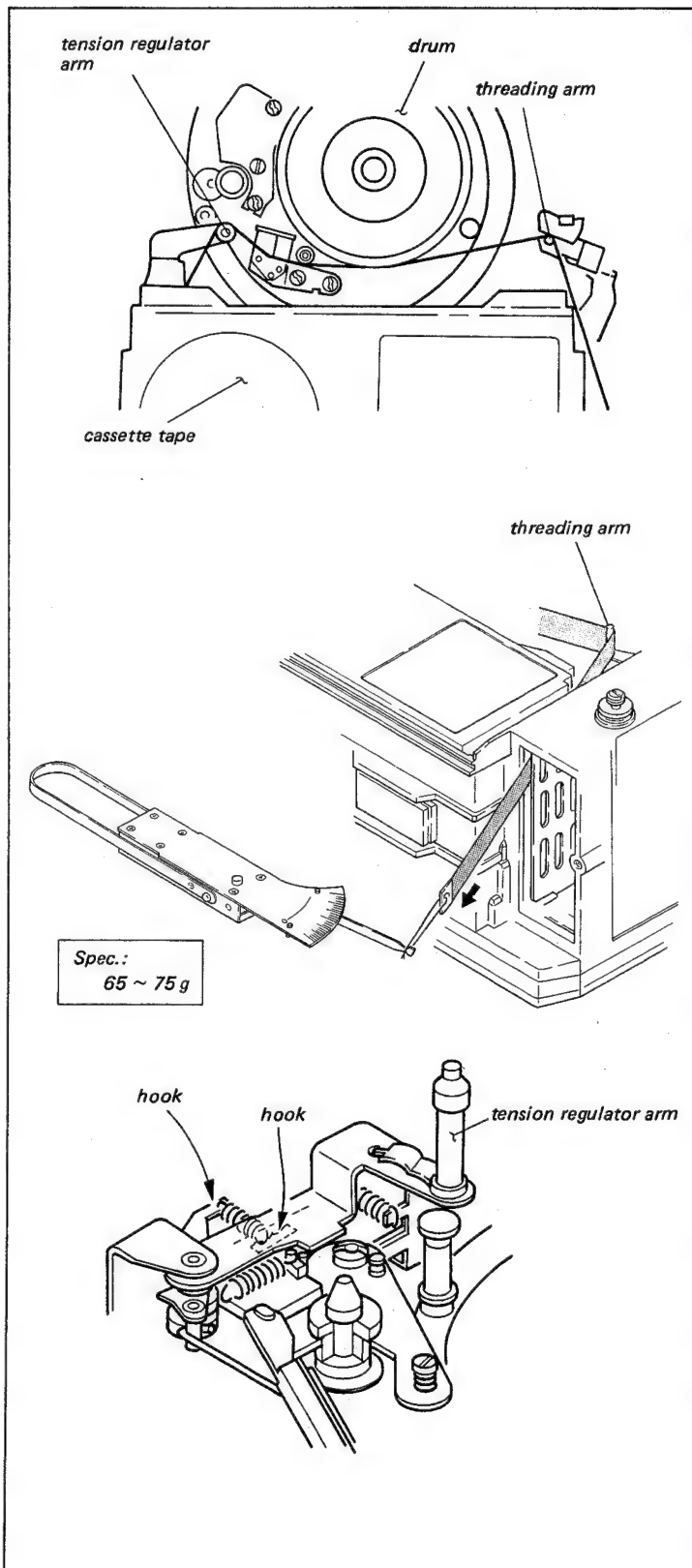
(Refer to alignment information.)

**Check procedure:**

- (1) Install the locally-specially-made-tape on the set in the threading end mode.
- (2) Open the lid of the battery case. If battery is in the case, remove it.
- (3) Thread the tape as shown in figure. Thread an end of the tape through between the battery case and the cabinet as shown in figure.
- (4) Hook the tension scale on an end of the tape.
- (5) Push the iron core of the pinch solenoid into the energized position with finger. (Don't remove finger.)
- (6) In the energized position, pull out the tension scale at a constant speed of approx. 12cm/sec. and confirm that the scale reading is in the specification.

**Adjustment procedure:**

- (1) Select the proper spring hook to meet the specification.



## 7-5. FWD TORQUE MEASUREMENT

**Tool:** PB alignment checker

Locally-specially-made-reel

(Refer to alignment information.)

Tension scale (100g full scale)

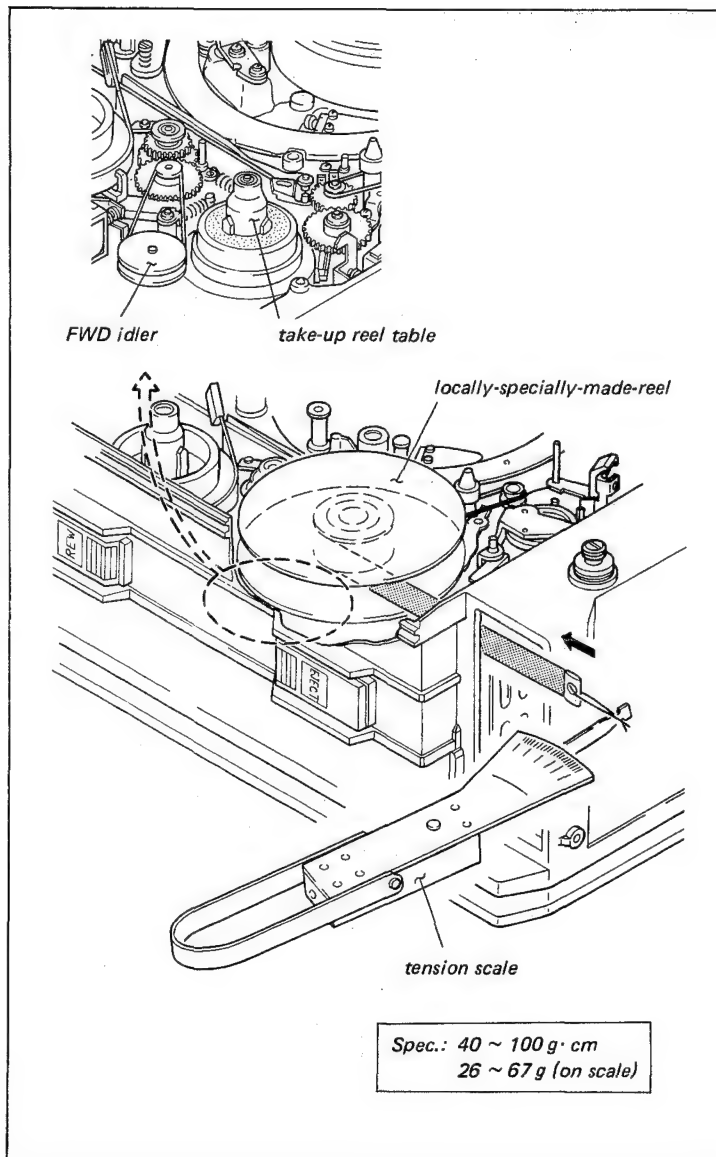
**Mode:** Playback

### Check procedure:

- (1) Open the lid of the battery case. If battery is in the case, remove it.
- (2) Install the locally-specially-made-reel on the take-up reel table. Thread the tape through between the battery case and the cabinet as shown in figure.
- (3) After the tape is pulled out, hook a tension scale on an end of the tape.
- (4) Put the machine into the PB mode.
- (5) Let the tape be pulled at the constant speed of approx. 12cm/sec. Check that the scale reading meets the required specification.

### Adjustment procedure:

- (1) Clean the matching surface of the FWD idler on the take-up reel table with a cloth moistened with cleaning fluid.
- (2) Replace the FWD idler.
- (3) After replacement, perform the check procedure.



## 7-6. EJECT TORQUE MEASUREMENT

**Tool:** PB alignment checker

Locally-specially-made-reel

(Refer to alignment information.)

Tension scale(50g full scale)

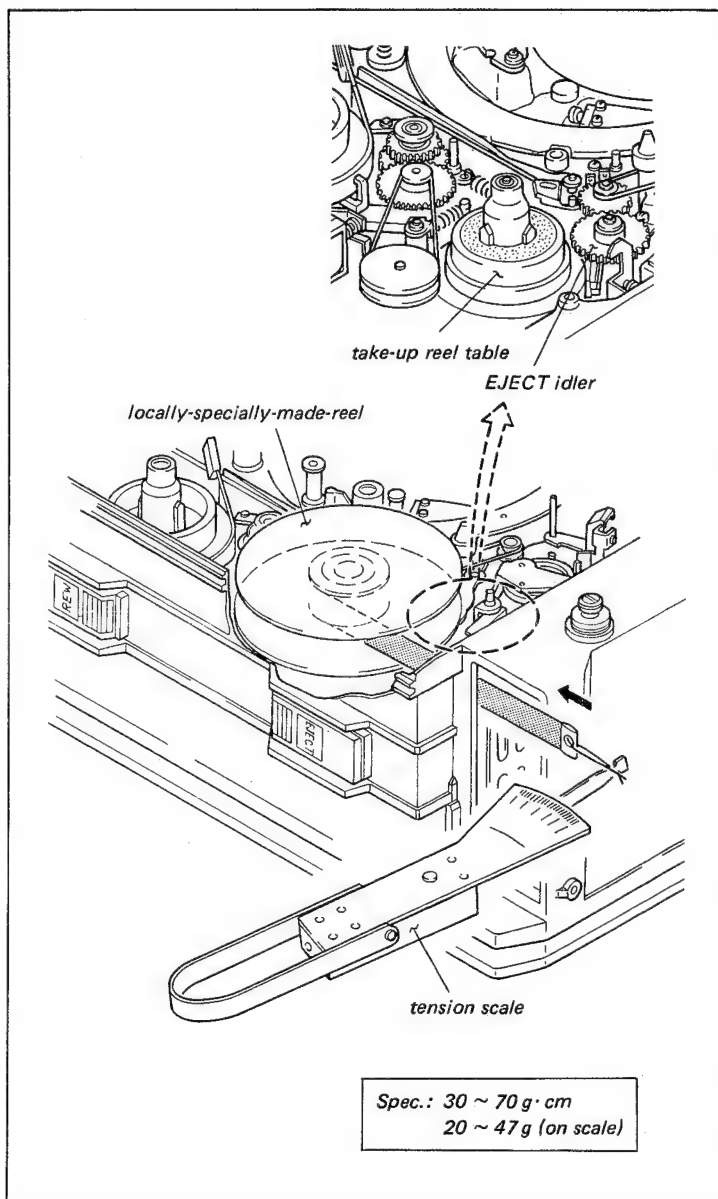
**Mode:** EJECT (measure during the unthreading mode.)

### Check procedure:

- (1) Open the lid of the battery case. If the battery is in the case, remove it.
- (2) Put the machine into the threading end mode.
- (3) Install the locally-specially-made-reel on the take-up reel table. Thread the tape through between the battery case and the cabinet.
- (4) After the tape is pulled out, hook a tension scale on an end of the tape.
- (5) Turn the SAVE/STANDBY switch into SAVE (into the unthreading mode.)
- (6) Let the tape be pulled at the constant speed of approx. 12cm/sec. in the unthreading mode. Check that the scale reading meets the required specification.

### Adjustment procedure:

- (1) Replace the EJECT idler.
- (2) After replacement, perform the check procedure.



## 7-7. REW TORQUE MEASUREMENT

**Tool:** PB alignment checker  
Reel table tension gauge  
Tension scale (100g full scale)

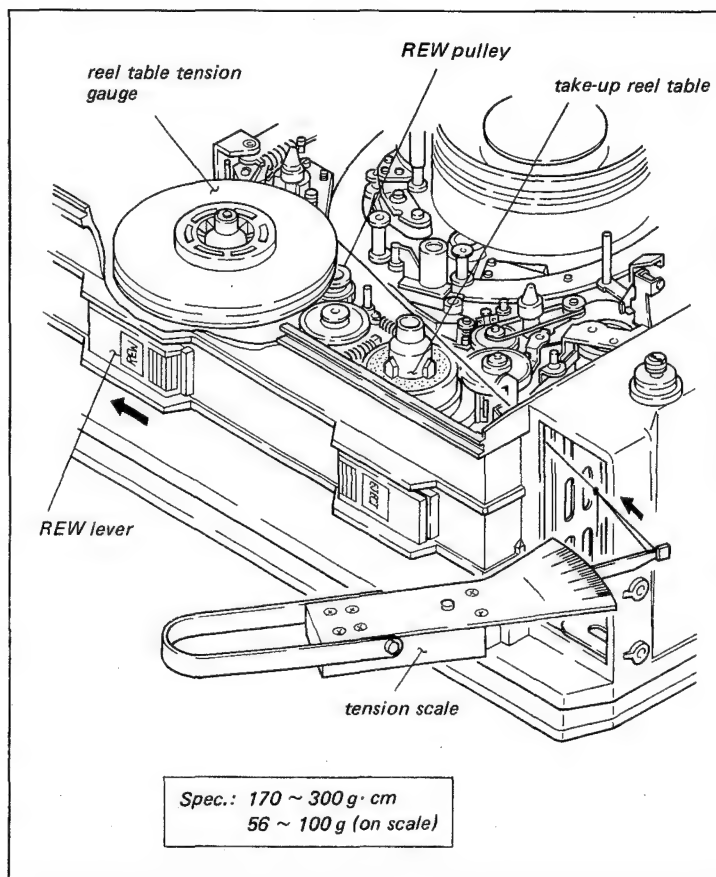
**Mode:** REW

### Check procedure:

- (1) Short between TP101 and REG 5V line on SS-23 board, and short between TP106 and TP103 with short clip leads.
- (2) Open the battery case. If the battery is in the case, remove it.
- (3) Install the reel table tension gauge on the supply reel table. Thread the string through between the battery case and the cabinet.
- (4) After the string is pulled out, hook a tension scale on an end of the string.
- (5) Put the machine into the REW mode while pressing the REW lever.
- (6) Let the string be pulled. Check that the scale reading meets the required specification.

### Adjustment procedure:

- (1) Remove the supply reel table and loosen the mounting screw of the REW adjusting plate.
- (2) Replace the REW pulley.
- (3) Perform the sec. 6-2-3 REW adjusting plate position adjustment.
- (4) After replacement, perform the check procedure.



## SECTION 8 TAPE RUN ALIGNMENT

### ALIGNMENT INFORMATION

#### ALIGNMENT TAPE

##### . Alignment tape for tracking adjustment

There are two types alignment tape for tracking adjustment.

- (1) Tracking tape for recorder, CR2-3
- (2) Tracking tape for player, CR2-1

CR2-3 (8-960-097-03)

Contents	For use
Video, Y track ;4MHz signal (track width;90μ) C track ;blank Audio, blank TC, CTL signal	.Video tracking adjustment for recorder .CTL head position adjustment for recorder .TC head position adjustment for recorder

CR2-1 (8-960-097-02)

Contents	For use
Video,Y track;4MHz signal (track width; 73μ) C track;5MHz signal (track width; 73μ) Audio,blank TC, CTL signal	.Video tracking adjustment for player .CTL head position adjustment for player .TC head position adjustment for player .Switching position adjustment for player and recorder

##### . Alignment tape for general adjustment

CR5-1A (8-960-097-37)

Contents	For use
Video, color-bar signal (100% white level) TC, SMPTE time code signal	.Video, Audio, Servo and Time Code system adjustments
Video, gated sweep signal Audio, 1KHz signal	.Video and Audio adjustments
Video, Y/C delay signal Audio, 10KHz signal	.Video adjustment .Audio head position adjustment
Video, 2T pulse/2T bar signal Audio, 1K-15KHz signal	.Video adjustment .Audio frequency response adjustment
Video, C-linearity signal Audio, 40Hz,7KHz,10KHz,15KHz signals	.Video adjustment .Audio frequency response adjustment
Video, C-monoscope signal (switching position is shifted) Audio, blank	.Video head dihedral adjustment
Video, blank Audio, blank CTL, audio 1KHz signal	.CTL head height adjustment

## MODE

### . Unthreading end mode

It means EJECT completion mode.

The threading guide, tension regulator arm and threading ring are put back at the cassette tape side completely.

### . Threading end mode

- (1) Connect the Head Amp. block of PB alignment checker to VTR.
- (2) Turn the SAVE/STNADBY switch of checker into STANDBY.
- (3) Keep pushing the cassett in shaft till the threading ring rotation is stopped.

This state means the threading end mode.

### . Threading mode

- (1) Connect the Head Amp. block of the PB alignment checker to VTR.
- (2) Turn the SAVE/STANDBY switch of checker into STANDBY.
- (3) Push the cassette in shaft and rotate the threading ring. Threading mode means that this threading ring is rotating.

### . PLAY mode without cassette tape

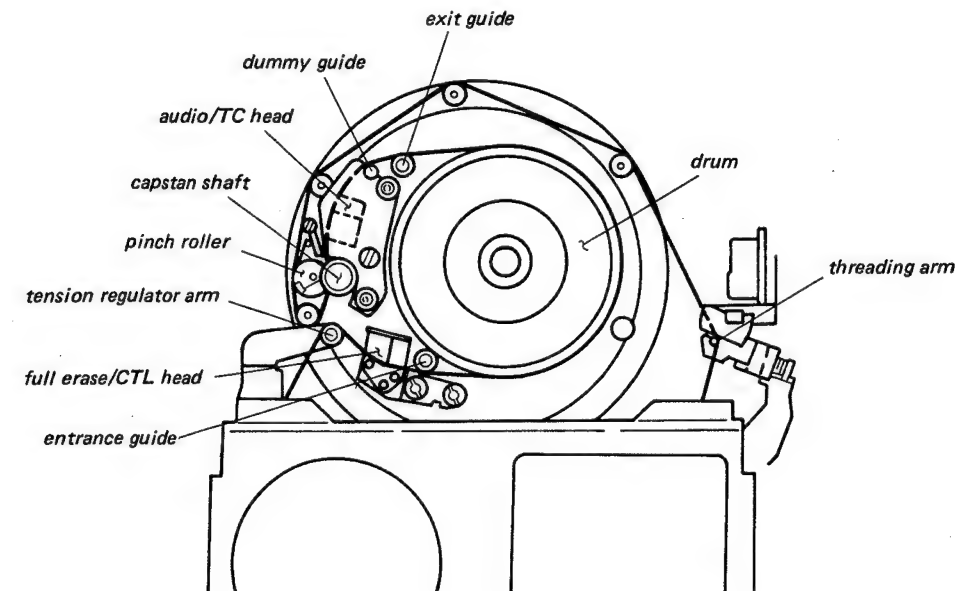
- (1) Connect the Head Amp. block of the PB alignment checker to VTR.
- (2) Turn the SAVE/STANDBY switch of checker into STANDBY.
- (3) Keep pressing the cassette in shaft till the threading ring rotation is stopped.
- (4) Turn the START/STOP switch of checker into START. This state means the PLAY mode without cassette tape.

### . PLAY mode

- (1) Connect the Head Amp. block of the PB alignment tape to VTR.
  - (2) Insert a cassette tape into VTR.
  - (3) Turn the SAVE/STANDBY switch of checker into STANDBY. (Threading starts)
  - (4) Turn the START/STOP switch of checker into START.
- This state means the PLAY mode.

## THE LOCATION OF HEADS AND TAPE GUIDES

The heads and tape guides are located as follows.

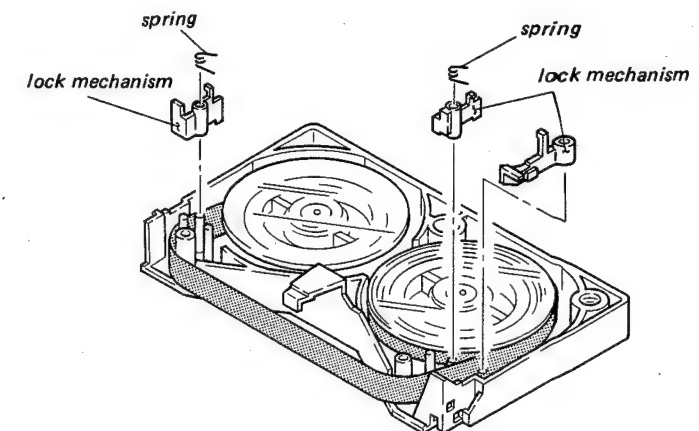
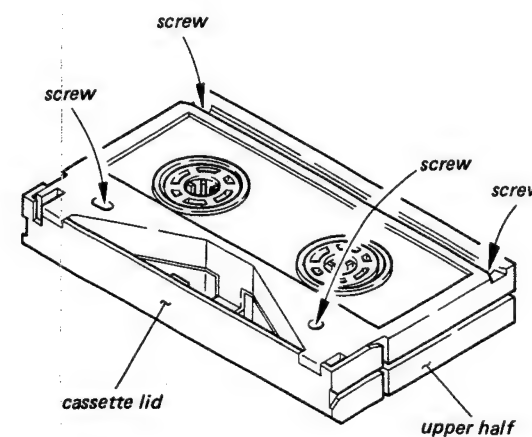


## HOW TO MAKE THE CASSETTE TAPE WITHOUT LID

Since the VTR is designed compact size, the check and adjustment can not be performed if cassette tape lid is installed.

The cassette tape lid removal procedures are as follows:

- (1) Remove the four screws on the back of the cassette as shown in figure, and remove the upper half of the cassette.
- (2) Remove the lock mechanism parts and the springs on the left and right.
- (3) Remove the cassette lid from the upper half.
- (4) Install the upper half on the lower half with four screws from the back side.





#### **HOW TO MAKE THE ALIGNMENT TAPE WITHOUT LID**

Since the VTR is designed compact size, the check and adjustment can not be performed if the alignment tape lid is installed.

Remove the lids of the alignment tape CR2-1 and CR2-3 for the tracking adjustment referring "How to make the cassette tape without lid".

#### **HOW TO TURN THE VTR INTO RECORD AND REW MODES WITHOUT CAMERA**

When the VTR is turned into record and REW modes without camera, record mode is performed as the following steps.

- (1) Connect the VA-1V to the VTR.
- (2) Connect the composite video signal to the VA-1V.
- (3) Insert a cassette tape to VTR (the tape is threaded automatically).
- (4) Press the REC button (record is started)
- (5) Re-press the REC button (record is stopped)
- (6) Press the EJECT button (the tape is unthreaded and then into EJECT mode).

When the VA-1V is connected to the VTR, REW mode is performed as the following steps.

- (1) Disconnect the composite video signal from the VA-1V.
- (2) Press the REW button in the direction of the arrow.

**(Note)**

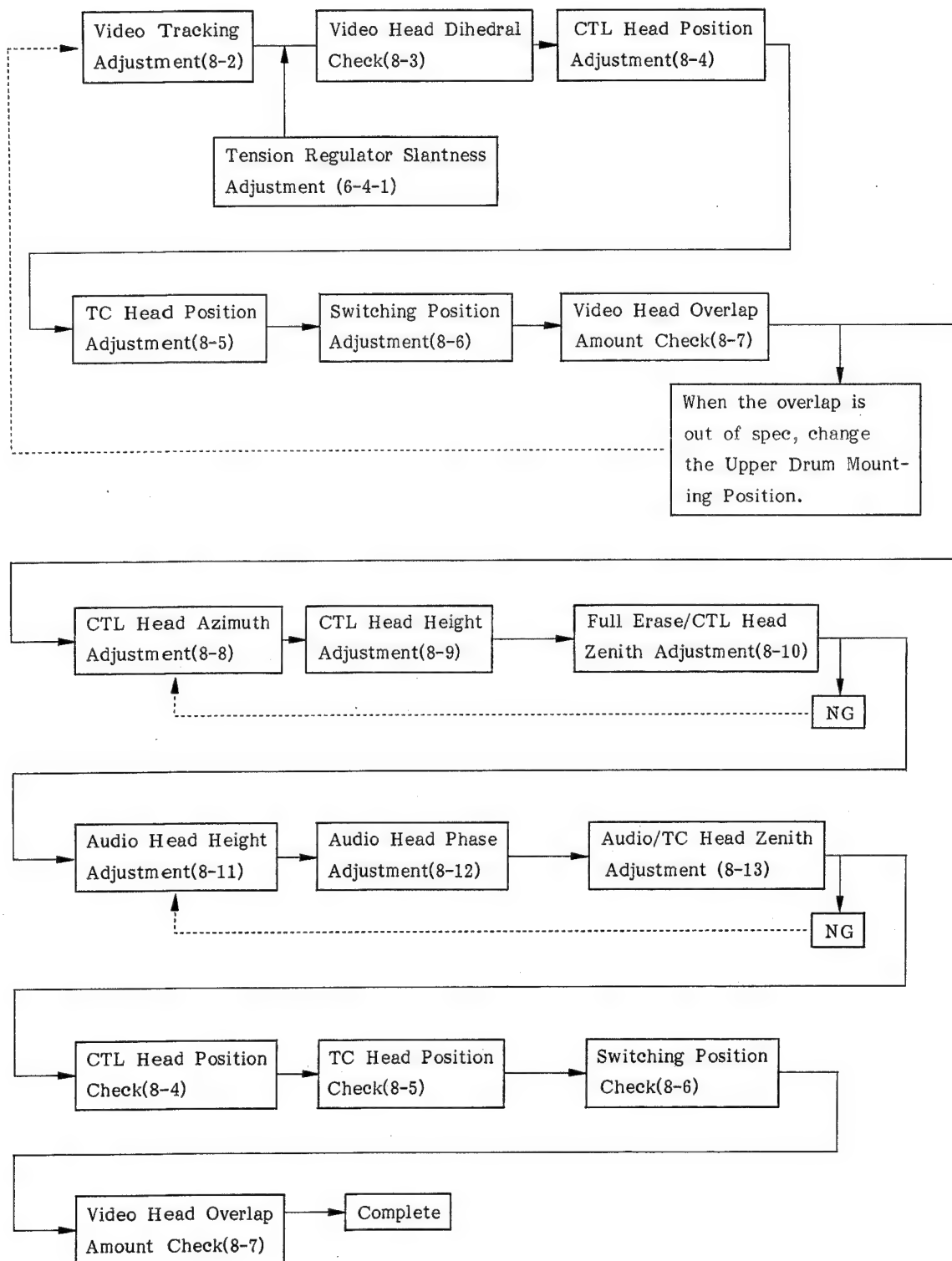
When the video signal is connected to the VA-1V in the REW mode, REW mode is stopped and VTR is put into the threading mode automatically.

#### **CAUTION FOR THE TRACKING ADJUSTMENT**

Connect the PB alignment checker to the VTR when the tracking adjustments of Video, Audio, CTL and Time Code Heads are performed. When the PB alignment checker is connected to the VTR, the VA-16 board can not be closed. Therefore, remove the VA-16 board once when the tracking adjustments are performed with PB alignment checker. Remove the CN109/SS-23 board and insert the dummy board that is supplied with the PB alignment checker. (The power does not function if the dummy board is not connected.) When the tracking check of Video, Audio, CTL and Time Code Heads are performed, it is not necessary to remove the VA-16 board from the VTR.

## ADJUSTMENT STEPS OF TRACKING ADJUSTMENT

Perform the tracking adjustment of Video, Audio, CTL and Time Code Heads as follows:



## 8-1. TAPE RUN ADJUSTMENT

### 8-1-1. Tape Run Adjustment Around Pinch Roller

**Mode:** Playback

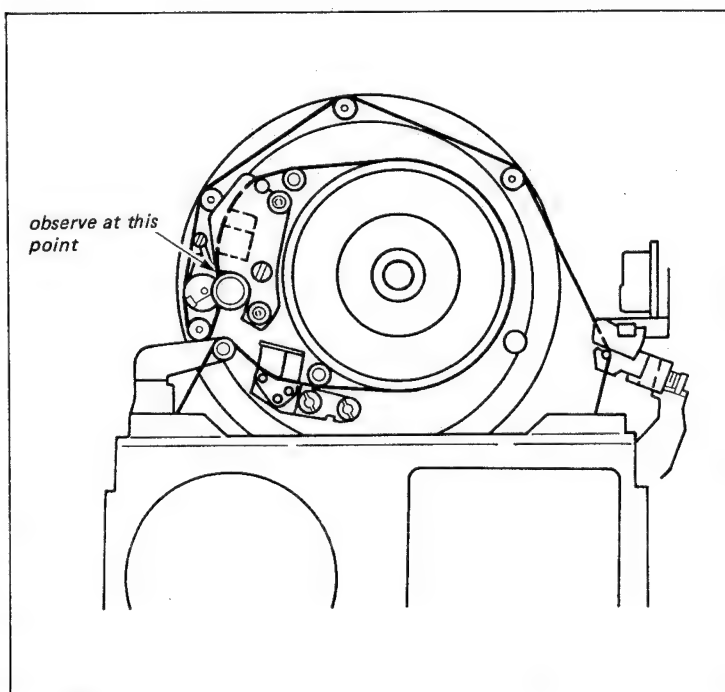
**Tool:** PB alignment checker

**Check procedure:**

- (1) Insert a cassette tape and put the machine into the playback mode. (Never use the alignment tape.)
- (2) Observe the surface of the running tape between the audio head and the capstan very carefully. Check that the tape tension is exactly equal at the tape top and the tape bottom.
- (3) Turn the VTR START/STOP switch of the alignment checker into STOP mode. (PAUSE mode.)
- (4) Turn the VTR START/STOP switch into START. Check that the tape tension is exactly equal at the tape top and the tape bottom.
- (5) Confirm to repeat the steps (3) and (4).

**Adjustment procedure:**

- (1) Perform the sec. 8-13 Audio/TC head zenith adjustment.
- (2) If the specification cannot be met by step (1), replace the pinch roller block. Perform the sec.6-5-3 Thread end position adjustment.



### 8-1-2. Tape Run Adjustment (T Drawer Guide Slantness Adjustment)

**Mode:** Playback

**Tool:** PB alignment checker

Cassette tape without lid

#### Check procedure:

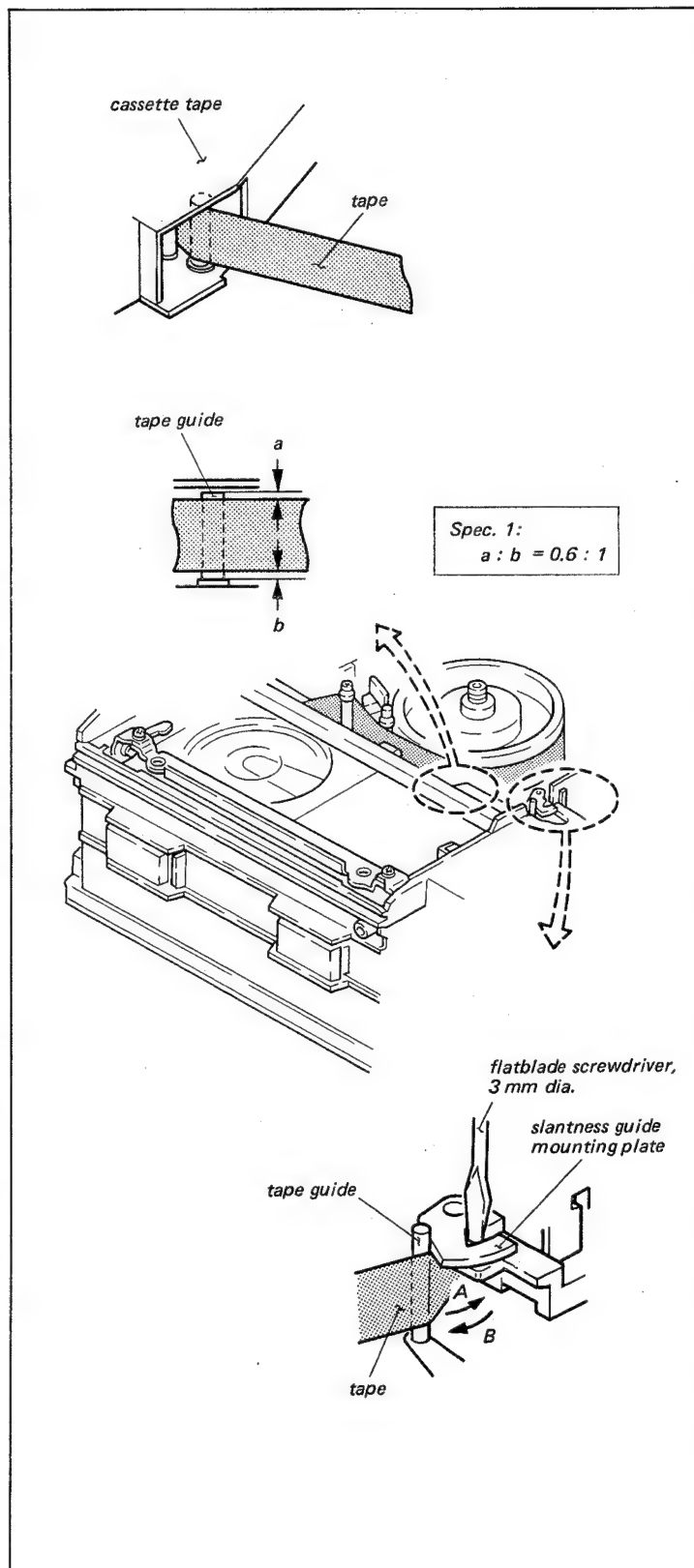
- (1) Insert a cassette tape and put the machine into playback mode (never use the alignment tape).
- (2) Check that the positional relationship between the tape and the tape guide at the take-up side of the cassette tape as shown in figure.  
(Spec. (1))
- (3) Turn the VTR START/STOP switch of the alignment checker into STOP mode (PAUSE mode).
- (4) Turn the VTR START/STOP switch into START again. Observe the surface of the running tape very carefully. Check that the tape tension is exactly equal at the tape top and tape bottom (Spec (2)).
- (5) Confirm to repeat at steps (3) and (4) four or five times. If the specification is met (1), a little amount of uneven tape tension at tape top or tape bottom is acceptable.

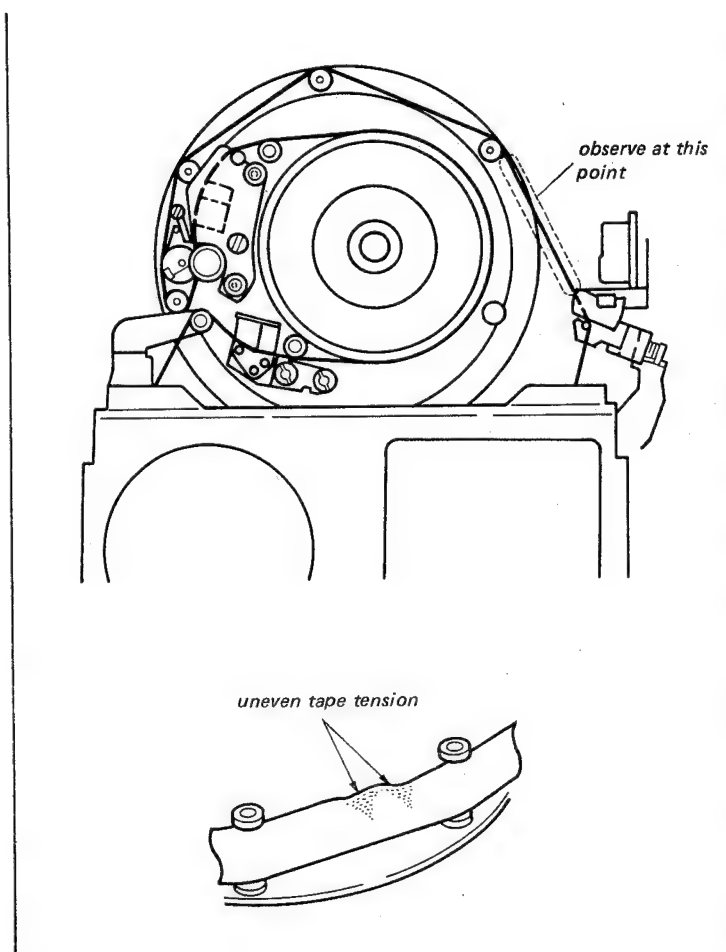
#### Adjustment procedure:

- (1) Adjust the position of the slantness guide mounting plate so that meets the required specifications (1) and (2).

.When the tape runs at the upper portion of the tape guide, move the slantness guide mounting plate to the A direction by hand.

.When the tape runs at the lower portion of the tape guide, move the slantness guide mounting plate to the B direction by flat-blade screwdriver, 3mm dia.





## 8-2. VIDEO TRACKING ADJUSTMENT

**Tool:** PB alignment checker

Alignment tape, CR2-3

Oscilloscope

Allen wrench (each edge has 1.5mm)

Inspection mirror

**Mode:** Playback the alignment tape

**Preparation:**

- (1) Connect the PB alignment checker to the VTR. (Refer to Operation Manual of PB alignment checker.)
- (2) Connect the oscilloscope to the video RF OUT terminal of checker.
- (3) Tap the bottom surface of the alignment tape on a hard surface lightly two or three times so that the tape is positioned to the lower side in the reel hub of the cassette tape. (For stable video tracking adjustment)
- (4) Insert the alignment tape and turn the SAVE/STANDBY switch of checker into STANDBY.

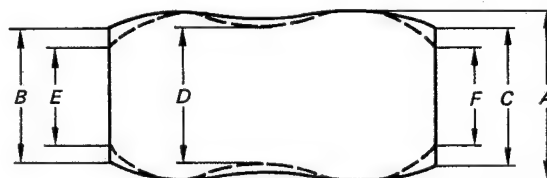
**Check procedure:**

- (1) Turn the RF CH SELECT switch of the alignment checker to A-B position.
- (2) Turn the CH BAL knob of the alignment checker so that the RF envelopes of CH-A and CH-B are equal level.
- (3) Turn the TRACKING knob of the alignment checker in the clockwise and counter-clockwise directions. Noting that the RF envelope maintains a flat envelope while amplitude increases and decreases.
- (4) Disconnect the clips at TP13 and TP14 on SS-23 board. Check that the RF envelope fluctuation and head-to-tape contact are within the specifications.

**Adjustment procedure:**

.When the tracking at the drum entrance side is no good.

- (1) Perform the check procedures (1) to (3) so that the RF envelope amplitude is made to 70 to 80% of the maximum amplitude.



*Spec.:*

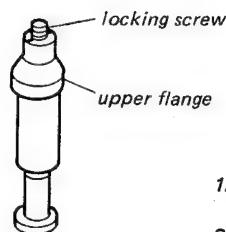
*head-to-tape contact*

$$\frac{B}{A} \geq 0.7 \quad \frac{C}{A} \geq 0.7$$

*fluctuation*

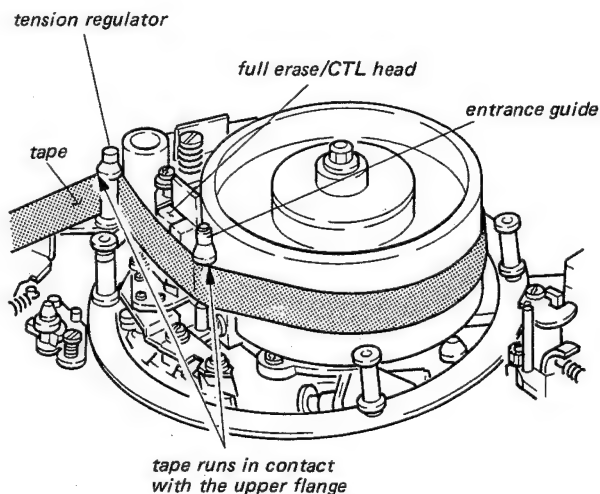
$$\frac{D}{A} \geq 0.9 \quad \frac{E}{B} \geq 0.9 \quad \frac{F}{C} \geq 0.9$$

< tape guide >



1. Loosen the locking screw about 2 to 3 turns.
2. Turn the upper flange of the tape guide.

< drum entrance side >



(2) Loosen the locking screw of the entrance guide. Turn the flange of the tape guide so that the tape does not contact with the flange.

(3) Perform the following steps so that the tape runs in contact with the upper flange of the tension regulator and RF envelope is flat simultaneously.

i. Adjust the height of the roller guide of the tension regulator. Check that the tape runs without curl at the upper flange with the inspection mirror.

(Acceptable range of the tape curl at the upper flange is less than 1/10 of the tape width.)

ii. Contact the upper flange of the entrance guide with the tape. Check that the tape runs without curl at the upper flange with the inspection mirror. (Acceptable range of the tape curl at the upper flange is less than 1/10 of the tape width.)

iii. Repeat the steps i and ii.

.When the tracking at the drum exit side is no good.

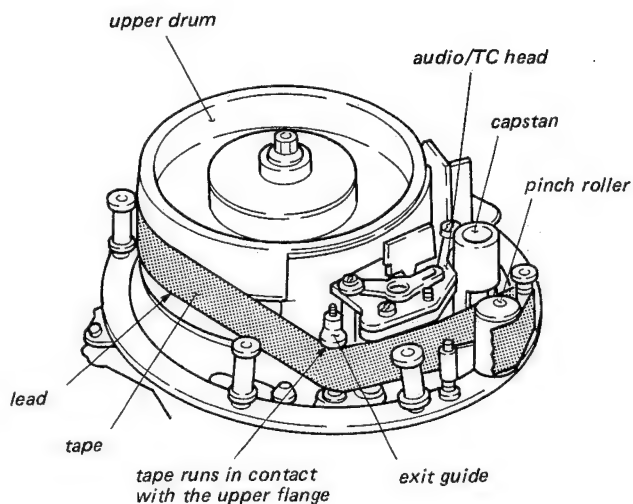
(4) Perform the check procedures (1) to (3) so that the RF envelope amplitude is made to 70 to 80% of the maximum amplitude.

(5) Adjust the height of exit guide so that the tape runs in contact with the lead of the drum and RF envelope is flat simultaneously.

Check that the tape runs without curl at the upper flange with the inspection mirror. (Acceptable range of the tape curl at the upper flange is less than 1/10 of the tape width.)

(6) Confirm the check procedures (1) to (4).

< drum exit side >



### 8-3. VIDEO HEAD DIHEDRAL ADJUSTMENT

.This adjustment is performed only for the Y head.

.The reference head is CH-A.

**Tool:** PB alignment checker

Alignment tape, CR5-1A

Monitor TV

Dihedral adjusting screw (four pieces)

**Mode:** Playback the alignment tape

#### Preparation:

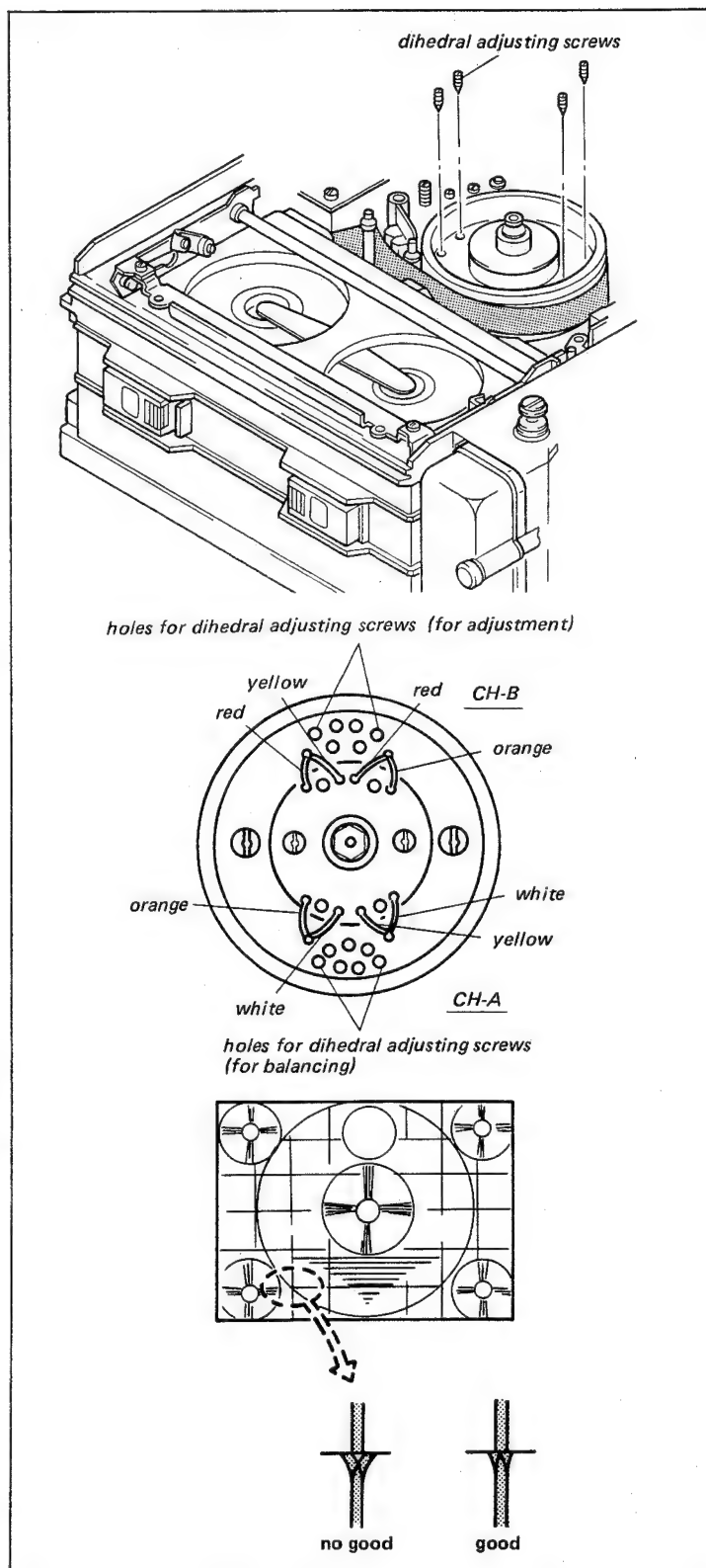
- (1) Connect the PB alignment checker to the VTR. (Refer to Operation Manual of PB alignment checker.
- (2) Connect the monitor TV to the checker.
- (3) Insert the alignment tape and turn the SAVE/STANDBY switch of checker into STANDBY.
- (4) Turn the VTR START/STOP switch of checker into START and playback the monoscope segment of the alignment tape. (for dihedral adjustment)

#### Check procedure:

- (1) Check the vertical line beneath the switching point visually on a monitor. If the vertical line does not split into two lines, no adjustment is necessary.

#### Adjustment procedure:

- (1) Screw lightly four dihedral adjusting screws into the upper drum.
- (2) Turn the adjusting screw adjacent to the Y head with red/yellow leads until some resistance is felt.
- (3) If this screw is turned further, the video head is moved and the dihedral is adjusted. Therefore, turn this screw an additional quarter turn.
- (4) Check for dihedral distortion. If the distortion has gotten worse, turn this screw back one turn and tighten the other screw (red/orange leads side) a quarter turn. Check again for dihedral distortion and continue in this way until dihedral error is eliminated.
- (5) When the adjustment is completed, remove the four dihedral adjusting screws. After removal, playback the





alignment tape and check dihedral again as error sometimes reappears after screws are removed.

#### 8-4. CTL HEAD POSITION ADJUSTMENT

**Tool:** PB alignment checker  
Alignment tape, CR2-3  
Oscilloscope

**Preparation:**

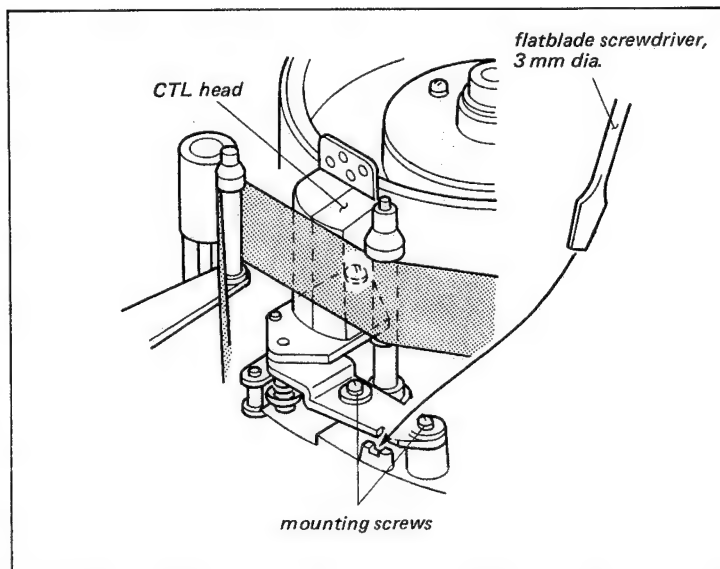
- (1) Connect the PB alignment checker to the VTR. (Refer to Operation Manual of PB alignment checker.)
- (2) Connect the oscilloscope to the RF output terminal of the checker.
- (3) Connect the clips for tracking control to TP13 and TP14 on SS-23 board, and connect the clip for switching pulse to TP5 on SS-23 board.
- (4) Short between TP2, TP3 and GND on SS-23 board with short clip leads.
- (5) Insert the alignment tape and turn the SAVE/STANDBY switch of checker to STANDBY.
- (6) Turn the VTR START/STOP switch of the checker into START and playback the alignment tape.

**Check procedure:**

- (1) Turn the TRACKING knob so that the RF envelope is made as large as possible.
- (2) Disconnect the clips from TP13 and TP14 on SS-23 board.
- (3) Check that the RF envelope is the same level as step (1).

**Adjustment procedure:**

- (1) Disconnect the clips from TP13 and TP14 on SS-23 board.
- (2) Loosen the two mounting screws about  $1/2$  to  $1/4$  turn. Insert the flatblade screwdriver, 3mm dia. in the notch of the head mounting plate and adjust the maximum output at the center of the waveform.



### 8-5. TC HEAD POSITION ADJUSTMENT

It is required that the sec.8-4 CTL head position adjustment is checked to be correct or properly adjusted before initiating this adjustment.

**Tool:** PB alignment checker

Alignment tape, CR2-3

Dual trace oscilloscope

Eccentricity driver (4 mm dia.)

**Preparation:**

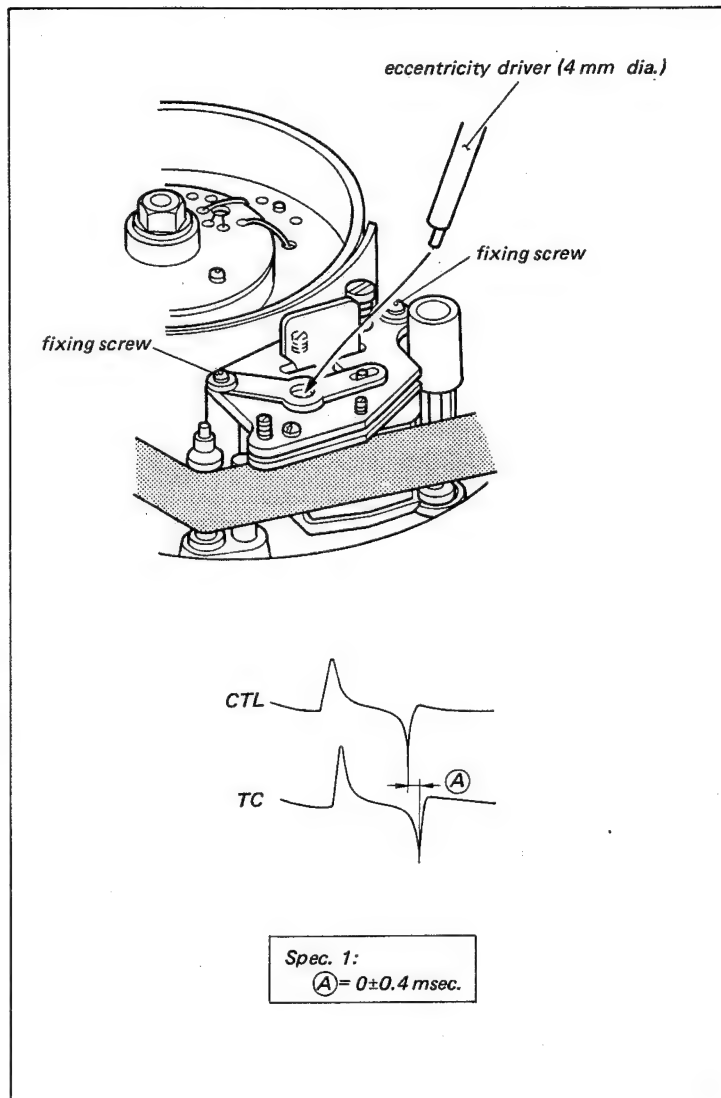
- (1) Connect the PB alignment checker to the VTR. (Refer to Operation Manual of PB alignment checker.)
- (2) Disconnect the clips for tracking control from TP13 and TP14 on SS-23 board and connect the clip for switching pulse to TP5 on SS-23 board.
- (3) Connect the oscilloscope to the TC output and CTL output terminals of checker.
- (4) Insert the alignment tape and turn the SAVE/STANDBY switch of checker into STANDBY.
- (5) Turn the VTR START/STOP switch of checker into START and playback the alignment tape.

**Check procedure:**

- (1) Check that the waveform meets the required specification(1).

**Adjustment procedure:**

- (1) Loosen the fixing screws.
- (2) Adjust the position of TC head with an eccentricity screw driver (4 mm dia.) so that meets the required specification(1).



## 8-6. SWITCHING POSITION ADJUSTMENT

**Tool:** PB alignment checker  
Alignment tape, CR2-1  
Oscilloscope

**Mode:** Playback the alignment tape

**Preparation:**

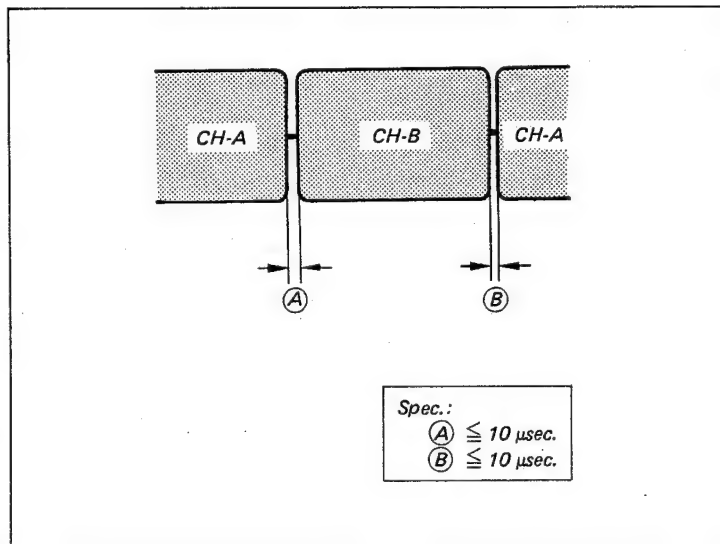
- (1) Connect the PB alignment checker to the VTR. (Refer to Operation Manual of PB alignment checker.)
- (2) Connect the oscilloscope to the RF output terminal of checker.
- (3) Playback the alignment tape.
- (4) Turn the RF CH SELECT switch of the checker to A-B position.
- (5) Turn the CH BAL knob of the checker so that the RF envelopes of CH-A and CH-B are equal level.

**Check procedure:**

- (1) Check that the CH-A and CH-B RF envelopes meet the specification at the switching pulse position.

**Adjustment procedure:**

- (1) Adjust RV1 and RV4 on SS-23 board meet the required specification.



## 8-7. VIDEO HEAD OVERLAP AMOUNT CHECK

**Tool:** PB alignment checker

Oscilloscope

BVP-1, BVP-3 or VA-1V

**Mode:** Self REC/PB

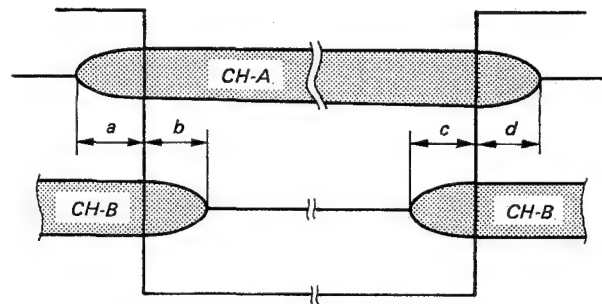
### Preparation:

- (1) Connect the BVP-1, BVP-3 or VA-1V to the VTR. Record the video signal about 1 to 2 minutes.
- (2) Open the VA board and disconnect the connectors, CN205 and CN206. Insert CN206 into the video connector of PB alignment checker. Connect the clip for switching pulse to TP5 on SS-23 board.
- (3) Short between TP2, TP3 and GND with short clip leads.
- (4) Connect the oscilloscope to the RF output and the SW PULSE output terminals of checker.
- (5) Playback the self recorded portion in step (1).

### Check procedure:

- (1) Check that the overlap of the Y head meets the required specification.
- (2) Disconnect the connector, CN205 that is connected in video connector of checker.
- (3) Insert CN206 into video connector of checker.
- (4) Playback the self recorded portion in step (1) of Preparation.
- (5) Check that the overlap of the C head meets the required specification.
- (6) If not, loosen the mounting screws of the upper drum. Turn the upper drum in counterclockwise direction while holding the drum pulley by hand. Tighten the mounting screws. Perform the same adjustment steps for the upper drum replacement.

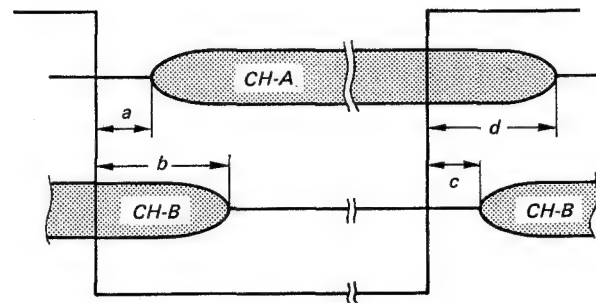
< Y head >



Spec. (Y head):

- $a \geq 350 \mu\text{sec.}$
- $b \geq 300 \mu\text{sec.}$
- $c \geq 350 \mu\text{sec.}$
- $d \geq 300 \mu\text{sec.}$

< C head >



Spec. (C head):

- $a \leq 180 \mu\text{sec.}$
- $b \geq 800 \mu\text{sec.}$
- $c \leq 180 \mu\text{sec.}$
- $d \geq 800 \mu\text{sec.}$

## 8-8. CTL HEAD AZIMUTH ADJUSTMENT

**Tool:** Cassette reference plate

Tension regulator slantness check tool

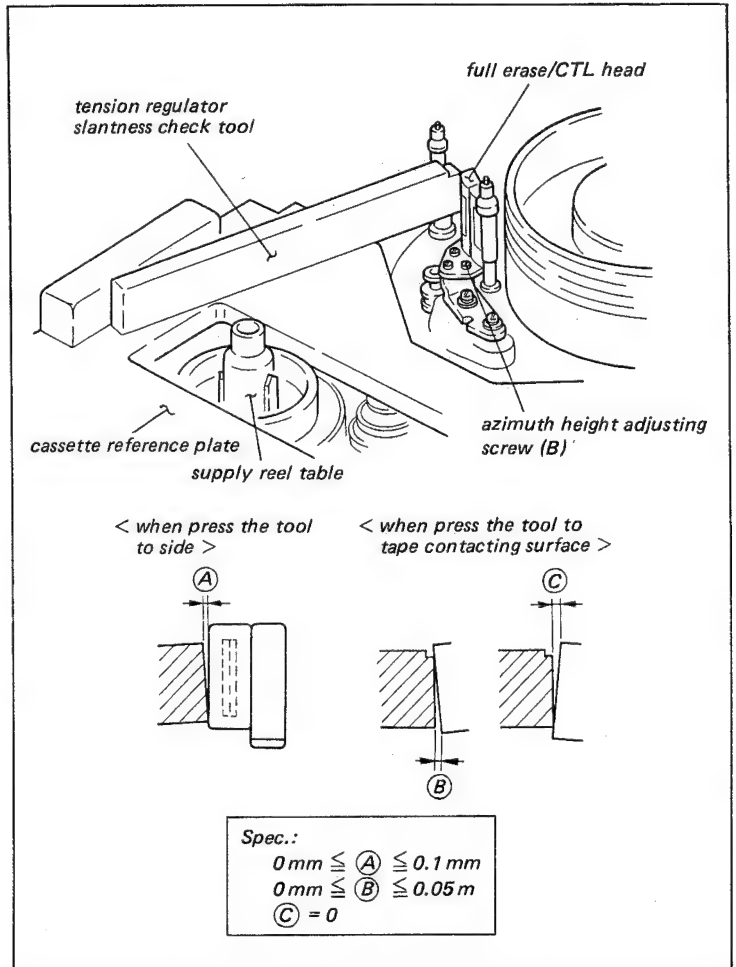
**Mode:** Any mode

**Check procedure:**

- (1) Install the cassette reference plate in the cassette position.
- (2) Place the tension regulator slantness check tool at the side of the CTL head as shown in figure. Check that the slantness of the CTL head meets the required specification.

**Adjustment procedure:**

- (1) Adjust the slantness by turning the azimuth height adjusting screw (B).



## 8-9. CTL HEAD HEIGHT ADJUSTMENT

**Tool:** PB alignment checker  
Alignment tape, CR5-1A  
Oscilloscope

### Preparation:

- (1) Connect the PB alignment checker to the VTR. (Refer to Operation Manual of PB alignment checker.)
- (2) Connect the oscilloscope to the CTL output terminal of checker.
- (3) Insert the alignment tape and turn the SAVE/STANDBY switch of checker to STANDBY.
- (4) Turn the VTR START/STOP switch into START and playback the audio 1kHz signal portion that is recorded on the CTL track of the alignment tape.

### Check procedure:

- (1) When pressing down the tape at (a) portion, or when pushing up the tape at (b) portion, check that the levels both decrease. If the levels increase, the following adjustments are required.

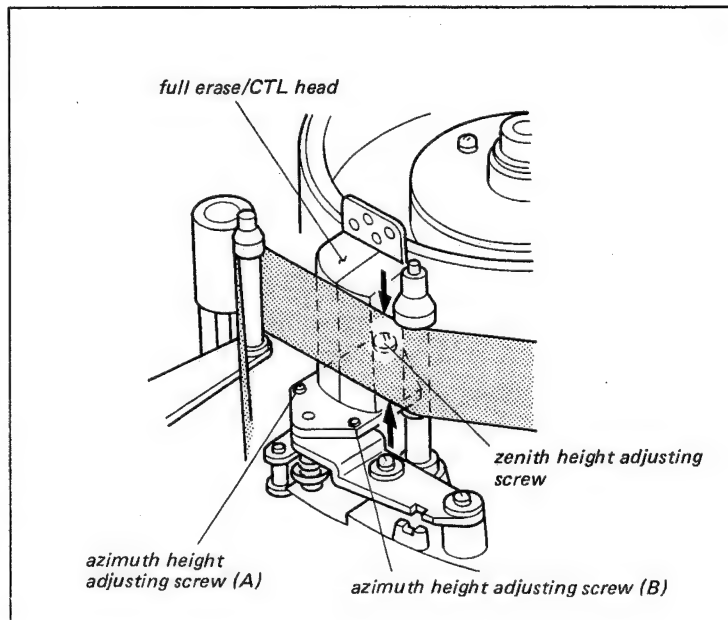
### Adjustment procedure:

When the levels increase while pressing down the tape at (a) portion.

- (1) Turn the azimuth height adjusting screws (A) and (B) in the clockwise direction and turn the zenith height adjusting screw an exactly equal amount in the counterclockwise direction. Adjust the maximum output waveform.

When the levels increase while pushing up the tape at (b) portion.

- (2) Turn the azimuth height adjusting screws (A) and (B) in the counterclockwise direction and turn the zenith height adjusting screw an exactly equal amount in the clockwise direction. Adjust the maximum output waveform.



## 8-10. FULL ERASE/CTL HEAD ZENITH ADJUSTMENT

**Tool:** Flatness plate

**Mode:** Any mode

**Check procedure:**

- (1) Check that the clearance between the head and the flatness plate meets the required specification, when the flatness plate is set on the tape guide and the full erase/CTL head.

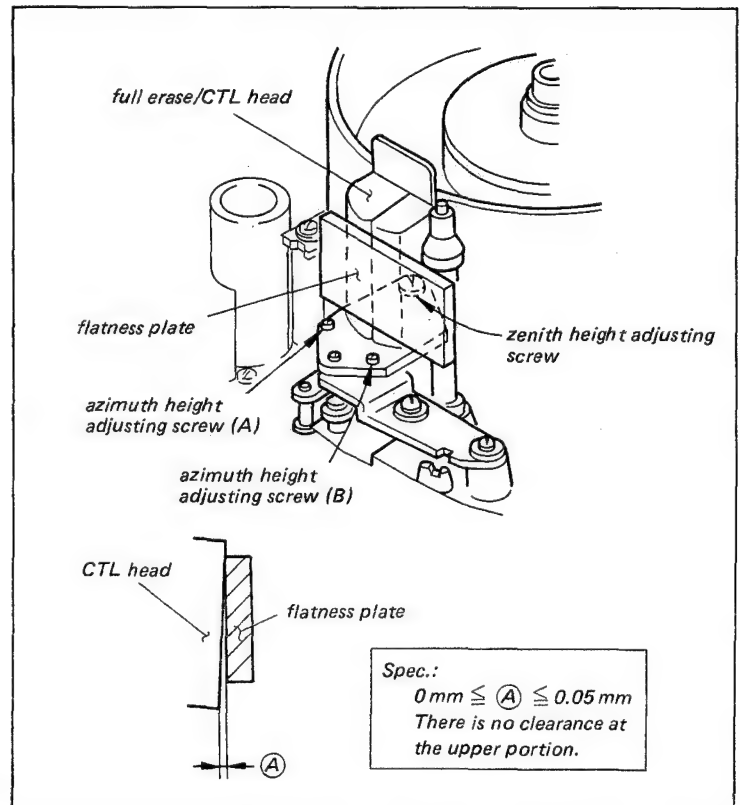
**Adjustment procedure:**

If there is a clearance at the bottom portion.

- (1) Turn the zenith height adjusting screw in the clockwise direction or turn the azimuth height adjusting screws (A) and (B) exactly equal amounts in counter-clockwise direction.

If there is a clearance at the top portion.

- (2) Turn the zenith height adjusting screw in the counterclockwise direction or the azimuth height adjusting screws (A) and (B) exactly equal amounts in the clockwise direction.



## 8-11. AUDIO HEAD HEIGHT ADJUSTMENT

**Tool:** PB alignment checker  
Alignment tape, CR5-1A  
Oscilloscope or VTVM

### Preparation:

- (1) Connect the PB alignment checker to the VTR. (Refer to Operation Manual of PB alignment checker.)
- (2) Connect the oscilloscope to the AUDIO CH-1 and CH-2 output terminals of checker.
- (3) Insert the alignment tape and turn the SAVE/STANDBY switch of checker into STANDBY.
- (4) Turn the VTR START/STOP switch of checker into START and playback the audio 1kHz portion of the alignment tape.

### Check procedure:

- (1) Check that the output level decreases when pressing down at (a) portion.
- (2) Check that the output level decreases when pushing up at (b) portion.

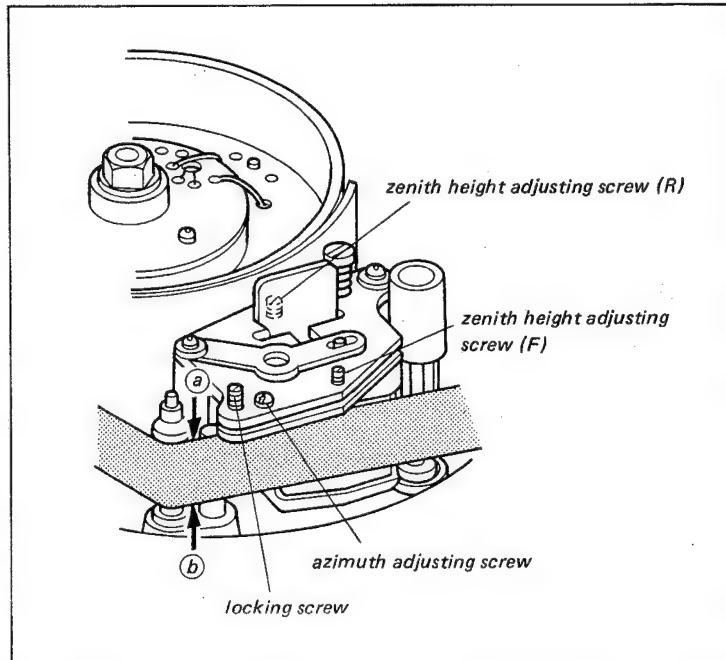
### Adjustment procedure:

When the output level increases while pressing down at (a).

- (1) Loosen the locking screw. Adjust the maximum output by turning the zenith height adjusting screws (R) and (F) exactly equal amounts in counterclockwise direction and turn the azimuth adjusting screw of an exactly equal amount in clockwise direction.
- (2) After adjustment, tighten the locking screw and check again.

When the level increases while pushing up at (b).

- (3) Adjust the maximum output by turning the zenith height adjusting screws (R) and (F) exactly equal amounts in clockwise direction and turn the azimuth adjusting screw an exactly equal amount in counterclockwise direction.
- (4) After adjustment, tighten the locking screw and check again.





## 8-12. AUDIO HEAD PHASE ADJUSTMENT

**Tool:** PB alignment checker  
Alignment tape, CR5-1A  
Dual trace oscilloscope

### Preparation:

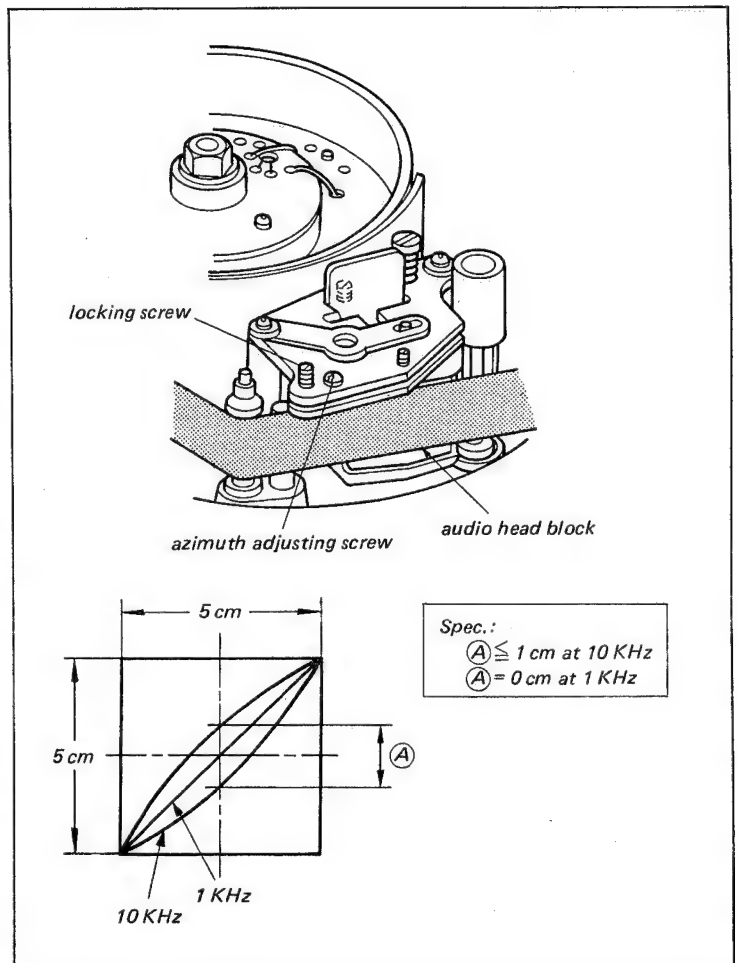
- (1) Connect the PB alignment checker to the VTR. (Refer to Operation Manual of PB alignment checker.)
- (2) Connect the HORIZONTAL and VERTICAL terminals of oscilloscope to the AUDIO OUT CH-1 and CH-2 terminals of checker.
- (3) Insert the alignment tape and turn the SAVE/STANDBY switch of checker into STANDBY.
- (4) Turn the VTR START/STOP switch into START and playback the audio 10kHz portion of the alignment tape.
- (5) Adjust the scope for horizontal and vertical amplitudes of 5cm of a lissajous waveform.

### Check procedure:

- (1) Check that the vertical amplitude at the center in the horizontal direction is within the specification.
- (2) Playback the 1kHz portion of the alignment tape and check that the lissajous waveform meets the required specification.

### Adjustment procedure:

- (1) Loosen the locking screw about 1/4 to 1/2 turn.
- (2) Adjust the phase by turning the azimuth adjusting screw so that it meets the required specification.
- (3) Tighten the locking screw and check again.



### 8-13. AUDIO/TC HEAD ZENITH ADJUSTMENT

**Tool:** Flatness plate

**Mode:** Unthreading end

**Check procedure:**

- (1) Check that the clearance between the head and the dummy guide meets the required specification, when the flatness plate is set on the audio/TC head and the dummy guide.

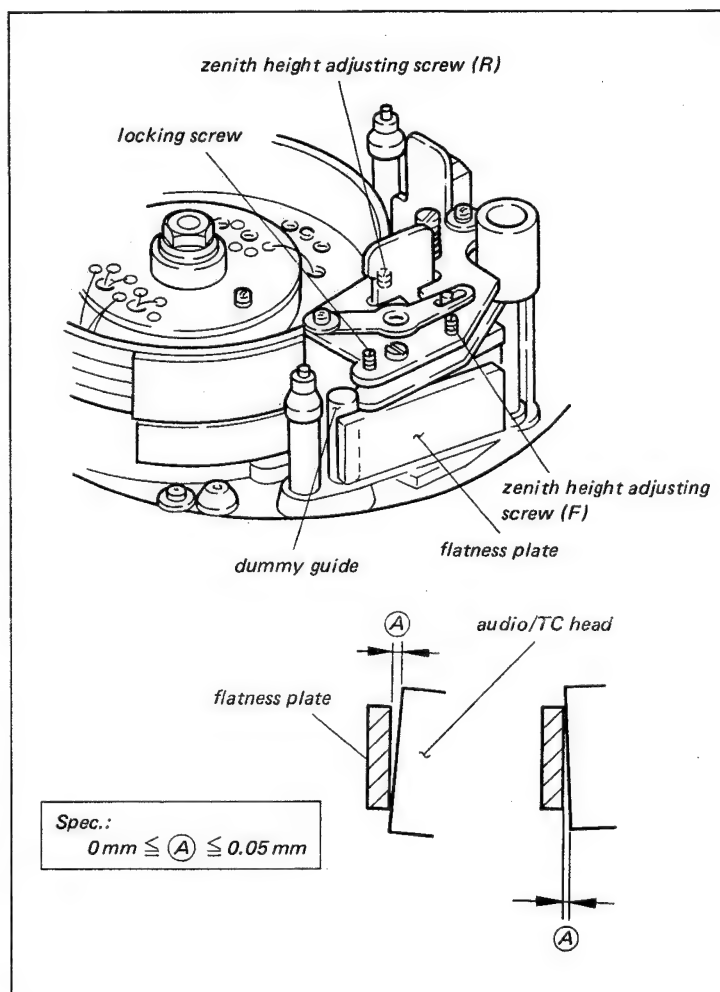
**Adjustment procedure:**

If there is a clearance at the bottom portion.

- (1) Loosen the locking screw about 1/4 to 1 turn.
- (2) Turn the zenith height adjusting screw (R) in the clockwise direction so that meets the required specification.
- (3) Tighten the locking screw and check zenith again.

If there is a clearance at the top portion.

- (4) Loosen the locking screw about 1/4 to 1 turn.
- (5) Turn the zenith height adjusting screw (R) in the counterclockwise direction so that meets the required specification.
- (6) Tighten the locking screw and check again.



## 8-14. AUDIO CONFL. HEAD TAPE TO HEAD CONTACT ADJUSTMENT

**Tool:** Audio oscillator

Oscilloscope

### Preparation:

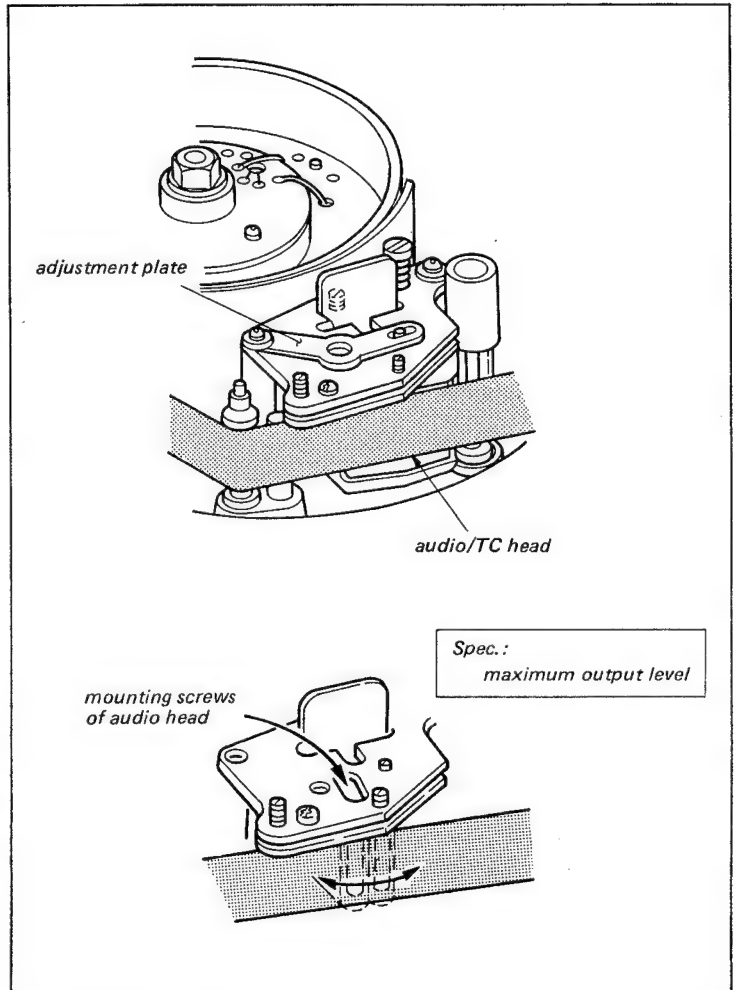
- (1) Turn the METER SELECT switch to AUDIO, AUDIO MANUAL/AUTO switch to MANUAL, AUDIO IN switch to MIC, and CH SELECT switch to CH-1.
- (2) Connect the 1kHz, -60dBm signal and adjust the level by AUDIO LEVEL knob so that the level meter indicates the blue colored position.
- (3) Put the machine into record mode.
- (4) Connect the oscilloscope to the TP702/VA board.

### Check procedure:

- (1) Check that the TP702 output meets the required specification.

### Adjustment procedure:

- (1) Remove the adjustment plate.
- (2) Loosen the mounting screws of the audio head and adjust the position of the head while turning to the direction of the arrow so that meets the required specification. Check again.



## 8-15. COMPOSITE SHOOTING ADJUSTMENT

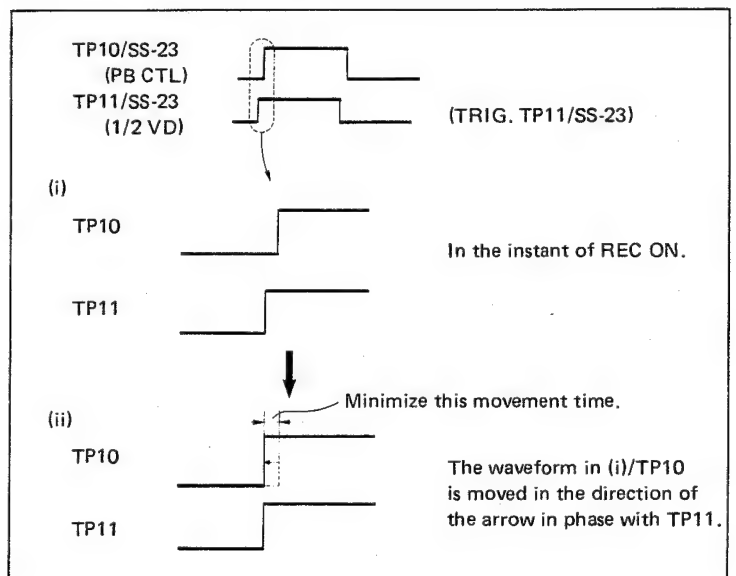
**Tool:** Dual trace oscilloscope

### Preparation:

- (1) Connect the CH-1 of the oscilloscope to TP11/SS-23 board and CH-2 to TP10/SS-23 board.
- (2) Insert a cassette tape to VTR.

### Adjustment procedure:

- (1) Adjust the RV102/SS-23 board so that the movement time of the TP10, PB CTL waveform (as shown in (i),(ii) ) is minimum in the instant of REC ON.
- (2) Confirm to repeat the REC ON/OFF about 10 times.



## SECTION 9

### POWER SUPPLY SYSTEM ALIGNMENT

#### [Equipment Required]

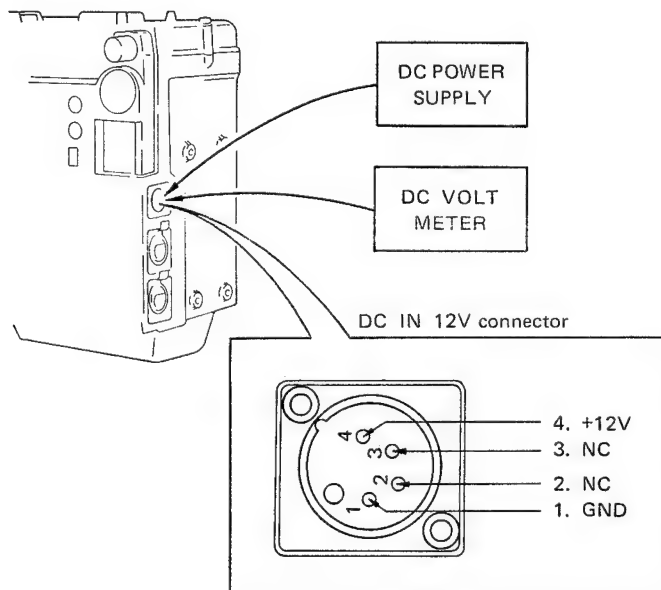
- Composite Adaptor; VA-1V
- Regulated DC Power Supply
- DC Voltmeter

#### [Connection]

The BVV-1A cannot record the video and audio signals without connecting camera.

Therefore, in order to put VTR into the REC mode without connecting the camera, it is necessary to use the COMPOSITE ADAPTOR; VA-1V or ALIGNMENT CHECKER; BW-536.

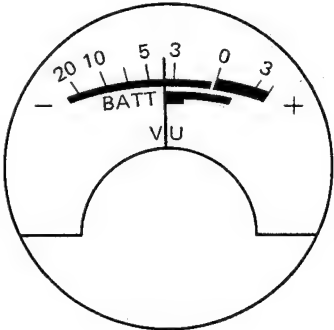
Connect the REGULATED DC POWER SUPPLY and the DC VOLTMETER as illustrated.



## 9-1. BATTERY END LEVEL ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• Connect the 10 K ohms resistor between TP105 and E101/SS-23.</li> <li>• Set the RV101/SS-23 to fully CCW position.</li> <li>• DC IN 12V connector; 12.0 Vdc</li> <li>• PAUSE mode</li> </ul>	TP105/SS-23  Make sure the level of TP105 is "low" level.	
<ul style="list-style-type: none"> <li>• DC IN 12V connector; 11.0 ± 0.01 Vdc</li> </ul>	TP105/SS-23  Slowly turn the RV101/SS-23 to CW direction and set to the position where level of TP105 is alternated "low" and "high".	⚙ RV101/SS-23

## 9-2. BATTERY METER CALIBRATION

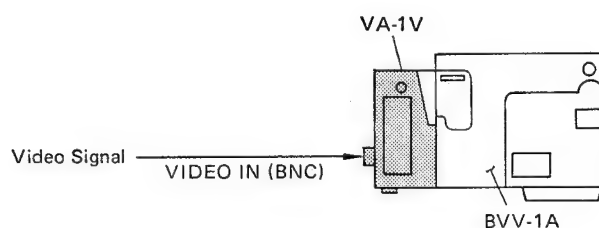
machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• Connect the 10 K ohms resistor between TP105 and E101/SS-23.</li> <li>• DC IN 12V connector; 11.05 ± 0.01 Vdc</li> <li>• REC mode</li> <li>• METER SELECT switch; BATT</li> </ul>	Level meter    Pointer should be stayed on edge of green zone.	⚙ RV1/CP-49

## SECTION 10 SERVO SYSTEM ALIGNMENT

### [Equipment Required]

- Composite Adaptor; VA-1V or Alignment Checker; BW-536
- Oscilloscope, dual trace

The BVV-1A cannot record the video and audio signals without connecting an exclusive camera. Therefore, in order to put VTR into the REC mode without connecting camera, it is necessary to use the COMPOSITE ADAPTOR; VA-1V or ALIGNMENT CHECKER; BW-536.



### 10-1. CAPSTAN FREE SPEED ADJUSTMENT

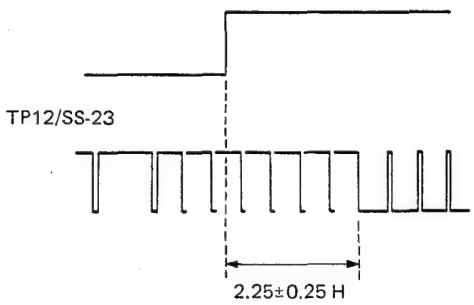
machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• REC mode at about the center portion of the tape.</li> </ul>	<p>TP4/SS-23</p> <p style="text-align: center;"> <math>\text{duty} \left( \frac{B}{A} \right) = 50 \pm 4\%</math> </p>	<ul style="list-style-type: none"> <li>RV6/SS-23</li> </ul>

### 10-2. TRACKING ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• Playing back the pre-recorded tape at about the center portion of the tape.</li> </ul> <p>PB mode; Short TP2 and E2/SS-23 and start the VTR.</p>	<p>TP-11/SS-23</p> <p>TP10/SS-23</p> <p style="text-align: center;"> <math>0 \pm 0.1 \text{ m sec}</math> </p>	<ul style="list-style-type: none"> <li>RV3/SS-23</li> </ul>

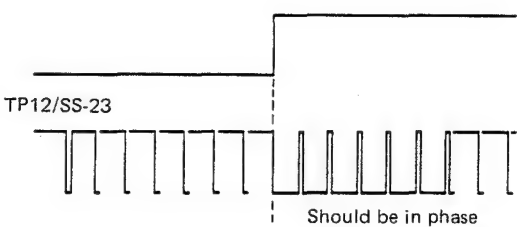
### 10-3. DRUM LOCK PHASE ADJUSTMENT

The sec. 8-6. Switching Position Adjustment should be completed before initiating this adjustment.

machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• Short TP1 and E1/SS-23.</li> <li>• Short TP3 and E3/SS-23.</li> <li>• REC mode</li> </ul>	<p>TP5/SS-23</p>  <p>TP12/SS-23</p> <p>2.25 ± 0.25 H</p>	<p>RV5/SS-23</p>

### 10-4. $\phi^2$ LOCK PHASE ADJUSTMENT

The sec. 8-6. Switching Position Adjustment should be completed before initiating this adjustment.

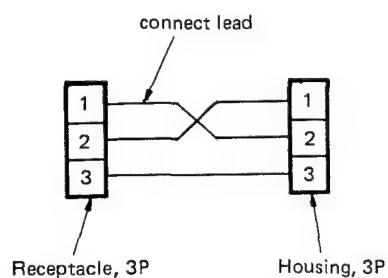
machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• Short TP1 and E1/SS-23.</li> <li>• REC mode</li> </ul>	<p>TP3/SS-23</p>  <p>TP12/SS-23</p> <p>Should be in phase</p>	<p>RV7/SS-23</p>



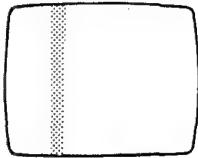
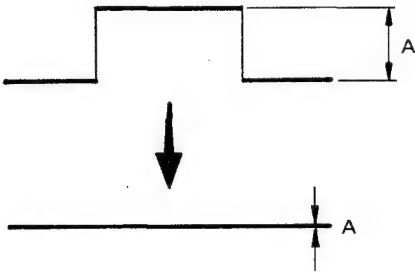
## 10-5. PICTURE SPLITTING COMPENSATOR ADJUSTMENT

### [Equipment Required]

- PB Alignment Checker
- HG-20 Cassette Tape
- Monitor TV
- Oscilloscope
- Local Specially-made Connector



### Step 1.

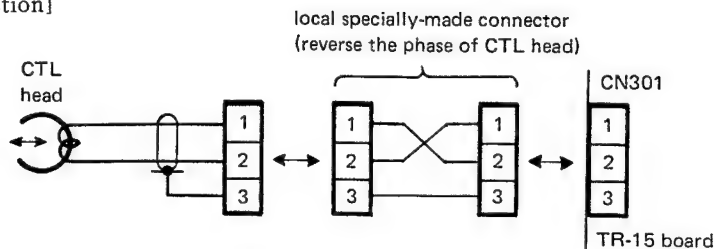
machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• Insert an HG-20 cassette tape.</li> <li>• Record the monoscope signal. (If not available, record the vertical line picture.)</li> </ul> <p>[Vertical line picture]</p> 	<p>TP1/DU-55</p>  <p>A = minimum</p>	<p>RV2/DU-55</p>

After the adjustment, press the RESET button, and record the monoscope signal about 1 min.



## Step 2.

### [Connection]



machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• Rewind the tape.</li> <li>• Insert the local specially-made connector between CTL head's harness and the connector CN301 on the TR-15 board.</li> <li>• Play back the self-recorded tape.</li> <li>• Put the monitor into the H-DELAY mode.</li> </ul>	<p>MONITOR</p> <p>B; less than 1.5 <math>\mu</math>sec.</p>	

- If the picture splitting meets the specification, remove the local specially-made connector.
- If not, perform the following step.

## Step 3.

machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• Play back the self-recorded tape.</li> <li>• Observe the crossing position of the vertical line.</li> <li>• Turn RV2 on the DU-55 board in the clockwise direction about 10 to 20 degrees.</li> <li>• Adjust RV1 on the DU-55 board so that coincide the crossing position with above checked position.</li> <li>• After the adjustments are completed, remove the local specially-made connector.</li> </ul>	<p>Spec. 1 Adjust the picture splitting to minimum.</p> <p>Spec. 2 Measure the level at TP1 (level B), and adjust the level at TP1 to <math>\frac{1}{2}B</math>.</p> <p>TP1/DU-55</p>	<p>RV2/DU-55</p>

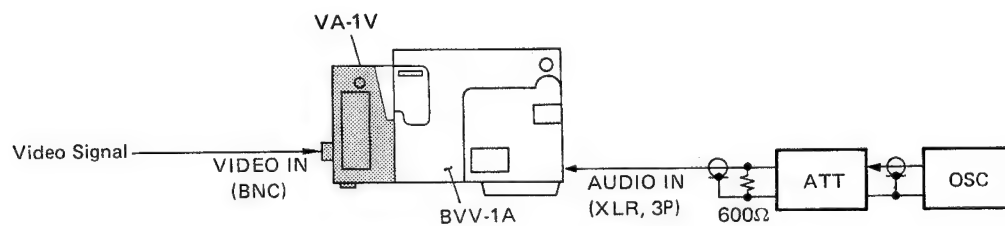
## SECTION 11

### AUDIO SYSTEM ALIGNMENT

#### [Equipment Required]

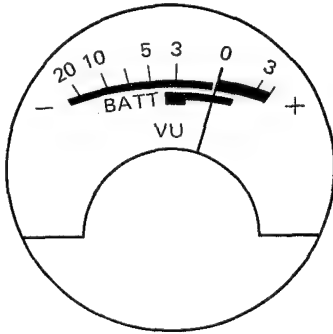
- Composite Adaptor; VA-1V
- Alignment Checker; BW-536
- Audio Oscillator
- Audio Attenuator
- VTVM

#### [Connection]



The BVV-1A cannot record the video and audio signals without connecting an exclusive camera. Therefore, in order to put VTR into the REC mode without connecting camera, it is necessary to use the COMPOSITE ADAPTOR; VA-1V or ALIGNMENT CHECKER; BW-536.

## 11-1. AUDIO METER CALIBRATION

machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• AUDIO IN CH-1/CH-2 connectors; 1 kHz, -60 dBm</li> <li>• AUDIO IN selectors; MIC</li> <li>• AUDIO MANU/AUTO switch; MANUAL</li> <li>• METER SELECT switch; AUDIO</li> <li>• AUDIO NR switch (S1/VA-16 board); OFF</li> <li>• CH SELECT switch; CH-1</li> <li>• STAND BY mode</li> </ul>	TP503/VA-16 (CH-1) TP603/VA-16 (CH-2) $-10 \pm 0.2$ dB	AUDIO LEVEL controls CH-1 CH-2
	Level meter  <p>Pointer should be stayed on '0'</p>	⚙ RV701/VA-16
<ul style="list-style-type: none"> <li>• Switch over the CH SELECT switch to CH-2.</li> </ul>	Level meter Pointer should be stayed on '0'	AUDIO IN CH-2 attenuator Attenuate value at this time = $0 \pm 0.2$ dB

The position of AUDIO LEVEL controls at this adjustment name the "REFERENCE POSITION" in following adjustment procedure.

To set the AUDIO LEVEL controls to "REFERENCE POSITION", apply the 1 kHz, -60 dBm signal to AUDIO IN connectors and adjust the AUDIO LEVEL controls so that level meter points to '0'.

## 11-2. LIMITER LEVEL ADJUSTMENT

AUDIO LEVEL controls should be set to "REFERENCE POSITION". See the 11-1.

machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• AUDIO IN CH-1/CH-2 connectors; 1 kHz, -30 dBm</li> <li>• AUDIO IN selectors; MIC</li> <li>• AUDIO MANU/AUTO selector; MANUAL</li> <li>• AUDIO NR switch (S1/VA-16 board); OFF</li> <li>• STAND BY mode</li> </ul>	TP503/VA-16 (CH-1) TP603/VA-16 (CH-2) $-2 \pm 1$ dB	⚙ RV3/LC-6 (CH-1) ⚙ RV4/LC-6 (CH-2)

### 11-3. BIAS TRAP ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• AUDIO IN CH-1/CH-2 connectors; No signal</li> <li>• AUDIO IN selector; LINE</li> <li>• Temporarily set the RV503 and RV603/VA-16 to fully CCW position.</li> <li>• REC mode</li> </ul>	TP501/VA-16 (CH-1) TP601/VA-16 (CH-2)  Adjust for minimum signal level (i.e. bias leaking)	<ul style="list-style-type: none"> <li>⌚ LV503/VA-16 (CH-1)</li> <li>⌚ LV603/VA-16 (CH-2)</li> </ul>

After completing this adjustment, the 11-4. Bias Adjustment and 11-9. Frequency Response Adjustment are required.

### 11-4. BIAS ADJUSTMENT

AUDIO LEVEL controls should be set to "REFERENCE POSITION". See the 11-1.

machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• AUDIO IN CH-1 connector; 1 kHz, -60 dBm CH-2 connector; No signal</li> <li>• AUDIO IN CH-1 selector; MIC CH-2 selector; LINE</li> <li>• AUDIO MANU/AUTO switch; MANUAL</li> <li>• AUDIO NR switch (S1/VA-16 board); OFF</li> <li>• REC mode</li> </ul>	TP701/VA-16  (1) Turn RV503 to fully CW. Slowly turn RV503 to CCW direction and find its position where the level of TP701 become maximum. (2) Slowly turn RV503 to further CCW direction and set to position where spec. is satisfied.  $\text{suitable level} = \text{maximum level} - 1.0 \sim -1.5 \text{ dB}$	<ul style="list-style-type: none"> <li>⌚ RV503/VA-16 (CH-1)</li> </ul>
<ul style="list-style-type: none"> <li>• AUDIO IN CH-1 connector; No signal CH-2 connector; 1 kHz, -60 dBm</li> <li>• AUDIO IN CH-1 selector; LINE CH-2 selector; MIC</li> <li>• AUDIO MANU/AUTO switch; MANUAL</li> <li>• AUDIO NR switch; OFF</li> <li>• REC mode</li> </ul>	TP701/VA-16  (1) Turn RV603 to fully CW. Slowly turn RV603 to CCW direction and find its position where the level of TP701 become maximum. (2) Slowly turn RV603 to further CCW direction and set to position where spec. is satisfied.  $\text{suitable level} = \text{maximum level} - 1.0 \sim -1.5 \text{ dB}$	<ul style="list-style-type: none"> <li>⌚ RV603/VA-16 (CH-2)</li> </ul>

## 11-5. RECORD CURRENT ROUGH ADJUSTMENT

AUDIO LEVEL controls should be set to "REFERENCE POSITION". See the 11-1.

machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• AUDIO IN CH-1/CH-2 connectors; 1 kHz, -60 dBm</li> <li>• AUDIO IN selectors; MIC</li> <li>• AUDIO MANU/AUTO selector; MANUAL</li> <li>• AUDIO NR switch (S1/VA-16 board); OFF</li> <li>• Short TP801 and E801/VA-16</li> <li>• REC mode</li> </ul>	TP502/VA-16 (CH-1) TP602/VA-16 (CH-2)  $-62 \pm 2 \text{ dB}$	<ul style="list-style-type: none"> <li>⊗ RV501/VA-16 (CH-1)</li> <li>⊗ RV601/VA-16 (CH-2)</li> </ul>

## 11-6. RECORD AMP EQUALIZER ADJUSTMENT

AUDIO LEVEL controls should be set to "REFERENCE POSITION". See the 11-1.

machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• AUDIO IN CH-1/CH-2 connectors; No signal</li> <li>• AUDIO IN selectors; LINE</li> <li>• Connect the <math>500 \pm 50 \text{ Hz}</math>, -45 dB signal to TP504 (CH-1) and TP604 (CH-2)/VA-16 board.</li> <li>• AUDIO MANU/AUTO selector; MANUAL</li> <li>• AUDIO NR switch (S1/VA-16 board); OFF</li> <li>• REC mode</li> </ul>	TP506/VA-16 (CH-1) TP606/VA-16 (CH-2)  Measure the level.	
<ul style="list-style-type: none"> <li>• Change the input signal that is connected to TP504 and TP604/VA-16.  <math>26 \pm 0.2 \text{ kHz}</math>, -45 dB</li> </ul>	TP506/VA-16 (CH-1) TP606/VA-16 (CH-2)  (1) Tuning Frequency Adjustment Maximize the level.  (2) Tuning Level Adjustment $26 \text{ kHz level} = 500 \text{ Hz level} + (14 \pm 0.1 \text{ dB})$	Tuning Frequency ⊗ LV502/VA-16 (CH-1) ⊗ LV602/VA-16 (CH-2) Tuning Level ⊗ RV502/VA-16 (CH-1) ⊗ RV602/VA-16 (CH-2)

## 11-7. RECORD CURRENT ADJUSTMENT

AUDIO LEVEL controls should be set to "REFERENCE POSITION". See the 11-1.

machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• AUDIO IN CH-1/CH-2 connectors; 1 kHz, -60 dBm</li> <li>• AUDIO IN selectors; MIC</li> <li>• AUDIO MANU/AUTO selector; MANUAL</li> <li>• AUDIO NR switch (S1/VA-16 board); OFF</li> <li>• Playing back the self-recorded tape with PB ALIGNMENT CHECKER (BW-536).</li> </ul>	<p>OUTPUT terminals CH-1, CH-2/BW-536</p> <p>-5.0 ± 0.5 dB</p> <p>If adjustment is found to be necessary, increase or decrease the Record signal level at TP501 (CH-1) or TP601 (CH-2) by the same signal level as found to be adjusted in the 11-5. Record Current Rough Adjustment procedure.</p>	<ul style="list-style-type: none"> <li>• RV501/VA-16 (CH-1)</li> <li>• RV601/VA-16 (CH-2)</li> </ul> <p>Repeat the sequence of record (adjustment) and playback (level check) until required specification is met.</p>

In the event the setting of RV501 or RV601 is changed, the 11-10. Audio Confidence Adjustment is required.

## 11-8. DOLBY C SPECTRAL SKEWING ADJUSTMENT

AUDIO LEVEL controls should be set to "REFERENCE POSITION". See the 11-1.

machine conditions for adjustment	spec.	adjustment						
<ul style="list-style-type: none"><li>• AUDIO IN CH-1/CH-2 connectors; No signal</li><li>• AUDIO IN selectors; LINE</li><li>• Connect the 1 kHz, -25 dB/17 kHz, -25 dB signals to TP504 (CH-1) and TP604 (CH-2)/VA-16 board.</li><li>• AUDIO MANU/AUTO selector; MANUAL</li><li>• AUDIO NR switch (S1/VA-16 board); ON</li><li>• STAND BY mode</li></ul>	<p>TP505/VA-16 (CH-1) TP605/VA-16 (CH-2)</p> <table><tr><th>Frequency</th><th>Level</th></tr><tr><td>1 kHz</td><td>refer</td></tr><tr><td>17 kHz</td><td>refer -8.3 dB</td></tr></table>	Frequency	Level	1 kHz	refer	17 kHz	refer -8.3 dB	<ul style="list-style-type: none"><li>● LV501/VA-16 (CH-1)</li><li>● LV601/VA-16 (CH-2)</li></ul>
Frequency	Level							
1 kHz	refer							
17 kHz	refer -8.3 dB							

## 11-9. FREQUENCY RESPONSE ADJUSTMENT

AUDIO LEVEL controls should be set to "REFERENCE POSITION". See the 11-1.

machine conditions for adjustment	spec.	adjustment												
<ul style="list-style-type: none"><li>• AUDIO IN CH-1/CH-2 connectors; 40 Hz, -16 dBm 1 kHz, -16 dBm 7 kHz, -16 dBm 10 kHz, -16 dBm 15 kHz, -16 dBm</li><li>• AUDIO IN selectors; LINE</li><li>• AUDIO MANU/AUTO selector; MANUAL</li><li>• AUDIO NR switch (S1/VA-16 board); OFF</li><li>• Playing back the self-recorded tape with PB ALIGNMENT CHECKER (BW-536.)</li></ul>	<p>OUTPUT terminals CH-1, CH2/BW-536</p> <table><tr><th>Frequency</th><th>Level</th></tr><tr><td>40 Hz</td><td>refer ± 3 dB</td></tr><tr><td>1 kHz</td><td>refer</td></tr><tr><td>7 kHz</td><td>refer ± 0.5 dB</td></tr><tr><td>10 kHz</td><td>refer ± 0.5 dB</td></tr><tr><td>15 kHz</td><td>refer ± 0.5 dB</td></tr></table> <p>If spec. is not met, the 11-4. Bias Adjustment is required.</p>	Frequency	Level	40 Hz	refer ± 3 dB	1 kHz	refer	7 kHz	refer ± 0.5 dB	10 kHz	refer ± 0.5 dB	15 kHz	refer ± 0.5 dB	11-4. BIAS ADJUSTMENT
Frequency	Level													
40 Hz	refer ± 3 dB													
1 kHz	refer													
7 kHz	refer ± 0.5 dB													
10 kHz	refer ± 0.5 dB													
15 kHz	refer ± 0.5 dB													
<ul style="list-style-type: none"><li>• Switch over the AUDIO NR switch to ON.</li></ul>	<p>OUTPUT terminals CH-1, CH-2/BW-536</p> <table><tr><th>Frequency</th><th>Level</th></tr><tr><td>40 Hz</td><td>refer ± 4 dB</td></tr><tr><td>1 kHz</td><td>refer</td></tr><tr><td>7 kHz</td><td>refer ± 1 dB</td></tr><tr><td>10 kHz</td><td>refer ± 1 dB</td></tr><tr><td>15 kHz</td><td>refer ± 1 dB</td></tr></table> <p>If spec. is not met, the 11-6. Record Amp Equalizer Adjustment is required.</p>	Frequency	Level	40 Hz	refer ± 4 dB	1 kHz	refer	7 kHz	refer ± 1 dB	10 kHz	refer ± 1 dB	15 kHz	refer ± 1 dB	11-6. RECORD AMP EQUALIZER ADJUSTMENT
Frequency	Level													
40 Hz	refer ± 4 dB													
1 kHz	refer													
7 kHz	refer ± 1 dB													
10 kHz	refer ± 1 dB													
15 kHz	refer ± 1 dB													

### 11-10. AUDIO CONFIDENCE LEVEL ADJUSTMENT

The 11-7. Record Current Adjustment should be completed before initiating this adjustment. AUDIO LEVEL controls should be set to "REFERENCE POSITION". See the 11-1.

machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"><li>• AUDIO IN CH-1/CH-2 connectors; 1 kHz, +4 dBm</li><li>• AUDIO IN selectors; LINE</li><li>• AUDIO MANU/AUTO selector; MANUAL</li><li>• AUDIO NR switch (S1/VA-16 board); OFF</li><li>• REC mode</li></ul>	TP702/VA-16  -4.5 ± 2 dB	RV702/VA-16

### 11-11. INDICATOR AUDIO OUT LEVEL ADJUSTMENT

The purpose of this adjustment is to regulate the output of Audio Level Indicator (VF) when the BVP-3A is connected to 50-pin connector for an exclusive camera. To perform this adjustment, connect the BVP-3A video camera.

AUDIO LEVEL controls should be set to "REFERENCE POSITION". See the 11-1.

Turn the AUDIO LEVEL control on the BVP-3A (VF) to fully MAX direction.

machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"><li>• AUDIO IN CH-1 connector; 1 kHz, -60 dBm</li><li>• AUDIO IN selector; MIC</li><li>• AUDIO MANU/AUTO selector; MANUAL</li><li>• AUDIO NR switch (S1/VA-16 board); OFF</li><li>• CH SELECT switch; CH-1</li><li>• STAND BY mode</li></ul>	20-pin in the Camera connector (50-pin)  -15 ± 0.1 dB	RV5/LC-6

### 11-12. ALARM SOUND MIX LEVEL ADJUSTMENT

The volume of both the audio monitor and alarm sound from the speaker or the earphone can be controlled at a same time with the VOLUME control.

Only the alarm sound volume can be adjusted independently with RV703/VA-16. When the set is shipped, RV703 is set to the maximum output level (fully CCW position).



### 11-13. TIME CODE CROSSTALK CANCEL ADJUSTMENT

Serial No. 10171 ~

machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"><li>• Connect the earphone to EAR-PHONE jack.</li><li>• No audio signal is input, set the REC mode after insert a cassette tape.</li><li>• Turn the VOLUME control to maximum.</li></ul>	Adjust so that the time code signal crosstalk from the earphone to minimum.	RV1/DUS-35

**NOTE:** When adjust above, set the mode of alarm tone (BATTERY END or END OF TAPE) does not ring.

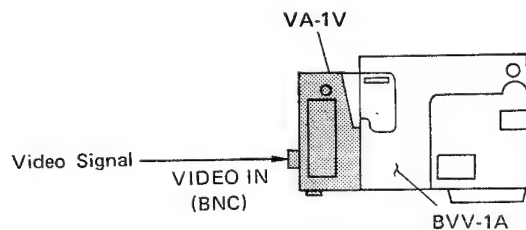
## SECTION 12

### VIDEO SYSTEM ALIGNMENT

#### [Equipment Required]

- Composite Adaptor; VA-1V
- Alignment Checker; BW-536
- DC Voltmeter
- Oscilloscope, dual trace
- Frequency Counter
- Sweep Generator
- NTSC Test Signal Generator
- Spectrum Analyzer

#### [Connection]

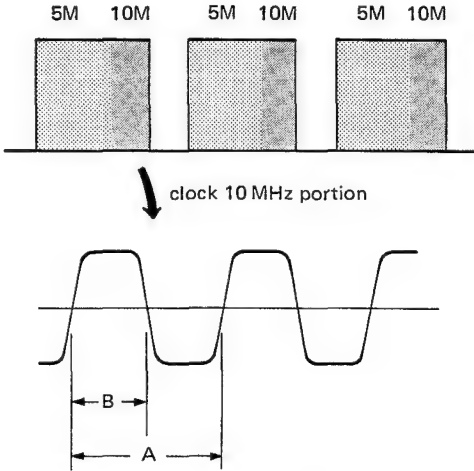


The BVV-1A cannot record the video and audio signals without connecting an exclusive camera. Therefore, in order to put VTR into the REC mode without connecting the camera, it is necessary to use the COMPOSITE ADAPTOR; VA-1V.

#### 12-1. PLL OPERATING POINT ADJUSTMENT

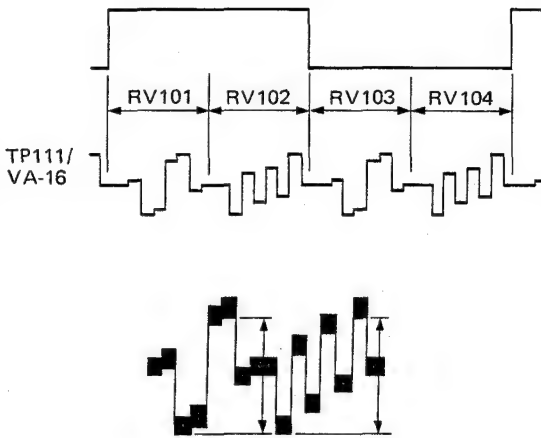
machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• VIDEO IN; EIA video signal</li> <li>• Disconnect the CN202 on the VA-16 board.</li> <li>• PAUSE (STANDBY) mode</li> </ul>	TP106/VA-16  $2.2 \pm 0.1 \text{ Vdc}$	Ⓐ RV111/VA-16

## 12-2. CCD CLOCK SHAPING ADJUSTMENT

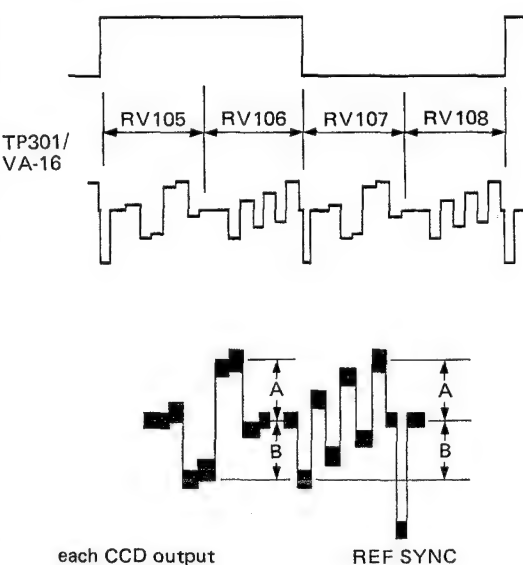
machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• VIDEO IN; EIA video signal</li> <li>• Disconnect the CN202 on the VA-16 board.</li> <li>• PAUSE (STANDBY) mode</li> </ul>	<p>IC106—pin 21/VA-16</p>  <p>TRIG; TP110/VA-16</p> <p><math>DUTY \left( \frac{B}{A} \right) = 50 \pm 5\%</math></p>	<p>RV113/VA-16</p>

## 12-3. CCD OUTPUT ADJUSTMENT

### Step 1. Output Level Adjustment

machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• VIDEO IN; NTSC color bar signal</li> <li>• PAUSE (STANDBY) mode</li> </ul>	<p>TP110/VA-16</p>  <p>TRIG; TP110/VA-16</p> <p>each CCD output level = <math>1.2 \pm 0.02</math> V</p> <p>Note; Measure in lower level of the noise amplitude.</p>	<ul style="list-style-type: none"> <li>RV101/VA-16</li> <li>RV102/VA-16</li> <li>RV103/VA-16</li> <li>RV104/VA-16</li> </ul>

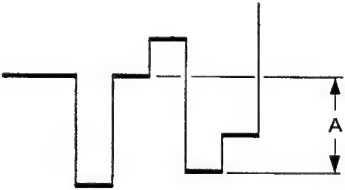
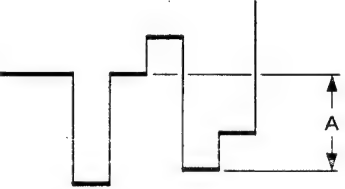
## Step 2. Output Linearity Adjustment

machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• VIDEO IN; NTSC color bar signal</li> <li>• PAUSE (STANDBY) mode</li> </ul>	<p>TP110/VA-16</p>  <p>TP301/ VA-16</p> <p>RV105 RV106 RV107 RV108</p> <p>each CCD output B = 100% refer A = <math>100 \pm 2.5\%</math></p> <p>REF SYNC</p> <p>Note; Measure in center of the noise amplitude. Except the REF SYNC</p>	<ul style="list-style-type: none"> <li>● RV105/VA-16</li> <li>● RV106/VA-16</li> <li>● RV107/VA-16</li> <li>● RV108/VA-16</li> </ul>

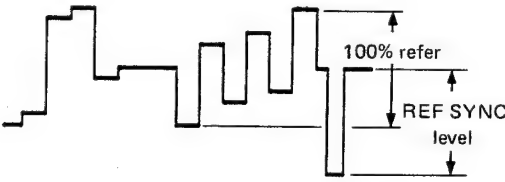
Repeat the sequence of step 1 and step 2 until both specifications are satisfied at a same time.

## 12-4. 100% C LEVEL ADJUSTMENT

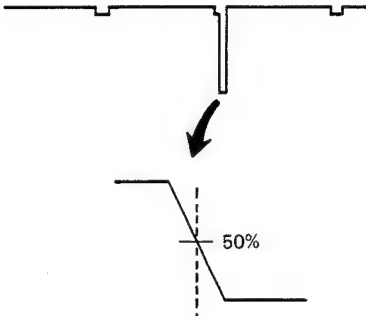
Serial No. 40771 ~

machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• VIDEO IN; 75% color bar signal (7.5% SET UP)</li> <li>• PAUSE (STANDBY) mode</li> <li>• Turn RV201/DUS-103 board fully CW position.</li> <li>• Adjust so that level of oscilloscope to five-scale by UNCAL knob.</li> </ul>	<p>TP301/VA-16</p>  <p>A = 5 scales</p>	<p>RV201/DUS-103</p>
<p>Change the input signal.</p> <ul style="list-style-type: none"> <li>• VIDEO IN; 100% color bar signal (7.5% SET UP)</li> <li>• Turn RV201/DUS-103 board to CCW direction.</li> </ul>	<p>TP301/VA-16</p>  <p>A = 5.6<sup>+0.2</sup><sub>-0</sub> scales</p>	<p>RV201/DUS-103</p>

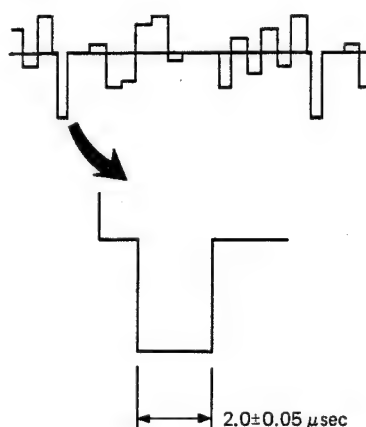
## 12-5. C REF SYNC LEVEL ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• VIDEO IN; NTSC color bar signal</li> <li>• PAUSE (STANDBY) mode</li> </ul>	<p>TP301/VA-16</p>  <p>TRIG: TP110/VA-16 REF SYNC level = 90 ± 2%</p>	<p>RV109/VA-16</p>

## 12-6. C REF SYNC TIMING ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• VIDEO IN; EIA video signal</li> <li>• Disconnect the CN202/VA-16.</li> <li>• Connect the 6.2 k ohms resistor between TP102 and TP107/VA-16.</li> <li>• Short TP112 and TP113/VA-16.</li> <li>• PAUSE (STANDBY) mode</li> </ul>	<p>TP301/VA-16</p>  <p>50%</p> <p>TRIG; TP108/VA-16</p> <p>When the shorting wire between the TP112 and TP113 is opened, the amount of sync shift should be met the specification. shift = less than <math>\pm 5</math> nsec</p>	<p>RV112/VA-16</p>

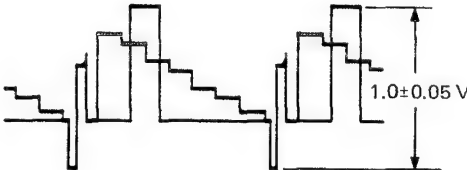
## 12-7. C REF SYNC WIDTH ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• VIDEO IN; NTSC color bar signal</li> <li>• PAUSE (STANDBY) mode</li> </ul>	<p>TP301/VA-16</p>  <p>2.0 <math>\pm</math> 0.05 <math>\mu</math>sec</p> <p>TRIG; TP110/VA-16</p>	<p>RV1/PG-3</p>

## 12-8. Y SYNC TIP CARRIER ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• VIDEO IN; EIA video signal</li> <li>• Disconnect the CN201/VA-16.</li> <li>• Short TP4 and TP113/VA-16.</li> <li>• PAUSE (STANDBY) mode</li> </ul>	TP401/VA-16  $4.4 \pm 0.05 \text{ MHz}$	⚙ RV5/VA-16


## 12-9. Y FM DEVIATION ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• VIDEO IN; NTSC color bar signal or any signal that has definite 100% white peak level.</li> <li>• Playing back the self-recorded tape with PB ALIGNMENT CHECKER (BW-536).</li> </ul>	VIDEO OUT connector /BW-536 (75 ohms termination)  	⚙ RV2/VA-16

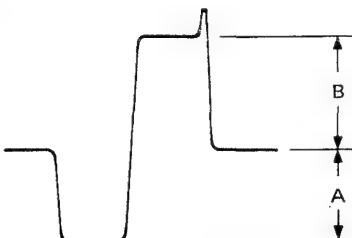
## 12-10. C SYNC TIP CARRIER ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• VIDEO IN; EIA video signal</li> <li>• Disconnect the CN202/VA-16</li> <li>• Short TP112 and TP113/VA-16</li> <li>• PAUSE (STANDBY) mode</li> </ul>	TP404/VA-16  $5.4 \pm 0.05 \text{ MHz}$	⚙ RV302/VA-16

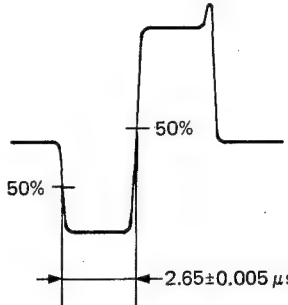
## 12-11. C FM DEVIATION ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• VIDEO IN; NTSC color bar signal</li> <li>• Playing back the recorded tape with BVW-10.</li> </ul>	TP6/CD-25 (BVW-10) 	● RV110/VA-16

## 12-12. Y REF SYNC LEVEL ADJUSTMENT

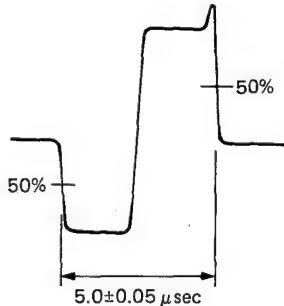
machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• VIDEO IN; EIA video signal</li> <li>• PAUSE (STANDBY) mode</li> </ul>	TP3/VA-16  <p>TRIG; TP110/VA-16</p> <p>A = 100% refer B = 125 ± 5%</p>	● RV1/VA-16

## 12-13. Y REF SYNC TIMING ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• VIDEO IN; EIA video signal</li> <li>• PAUSE (STANDBY) mode</li> </ul>	TP3/VA-16  <p>TRIG; TP110/VA-16</p>	● RV2/PG-3

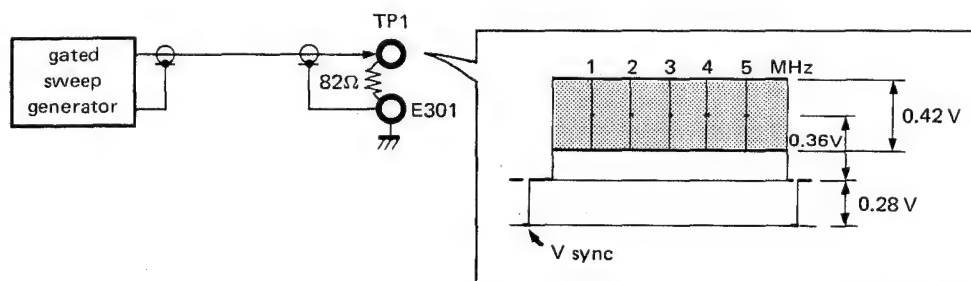


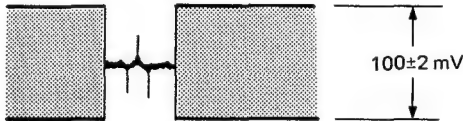
## 12-14. Y REF SYNC WIDTH ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• VIDEO IN; EIA video signal</li> <li>• PAUSE (STANDBY) mode</li> </ul>	<p>TP3/VA-16</p>  <p>50%</p> <p>50%</p> <p><math>5.0 \pm 0.05 \mu\text{sec}</math></p> <p>TRIG; TP110/VA-16</p>	<p>RV3/PG-3</p>

## 12-15. Y HIGH COMPONENT MIX LEVEL ADJUSTMENT

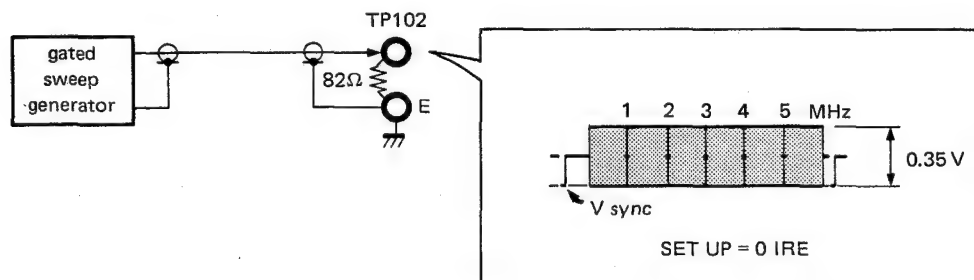
When this adjustment is performed, connect the gated sweep signal to TP1/VA-16 board.



machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• VIDEO IN; EIA video signal</li> <li>• Disconnect the CN201 on the VA-16 board.</li> <li>• Connect the gated sweep signal as above-mentioned.</li> <li>• PAUSE (STANDBY) mode.</li> </ul>	<p>IC1—pin 18</p>  <p>100 ± 2 mV</p> <p>TRIG; TP110/VA-16</p>	<p>RV12/VA-16</p>

## 12-16. C HIGH COMPONENT MIX LEVEL ADJUSTMENT

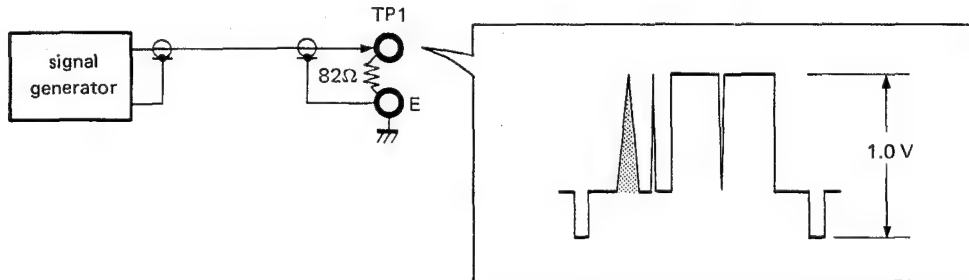
When this adjustment is performed, connect the gated sweep signal to TP102/VA-16 board.



machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• VIDEO IN; EIA video signal</li> <li>• Disconnect the CN202 on the VA-16 board.</li> <li>• Connect the gated sweep signal as above-mentioned.</li> <li>• PAUSE (STANDBY) mode</li> </ul>	<p>IC301—pin 18</p> <p>TRIG; TP110/VA-16</p>	<p>RV304/VA-16</p>

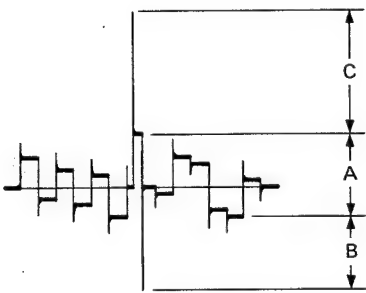
## 12-17. Y WHITE/DARK CLIP ADJUSTMENT

When this adjustment is performed, connect the 2Tpulse/T bar with Inv. 2T pulse signal to TP1/VA-16 board.

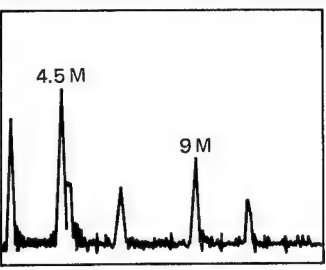


machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• VIDEO IN; EIA video signal</li> <li>• Disconnect the CN201 on the VA-16 board.</li> <li>• Connect the 2T pulse and T bar signal as above-mentioned.</li> <li>• PAUSE (STANDBY) mode</li> </ul>	<p>TP6/VA-16</p> <p>TRIG; TP110/VA-16</p> <p>A = 100% refer B = <math>60 \pm 2.5\%</math></p>	<p>RV4/VA-16 DARK CLIP</p>
<ul style="list-style-type: none"> <li>• Temporarily solder the 250 pF capacitor in parallel with C8/VA-16 board.</li> </ul>	<p>TP6/VA-16</p> <p>TRIG; TP110/VA-16</p> <p>A = 100% refer C = <math>150 \pm 2.5\%</math></p>	<p>RV3/VA-16 WHITE CLIP</p>
<ul style="list-style-type: none"> <li>• Remove the 250 pF capacitor in the above.</li> </ul>	<p>Q11—collector</p> <p>TRIG; TP110/VA-16</p>	<p>RV6/VA-16 SMEAR COMPENSATE</p>

## 12-18. C HIGH/LOW CLIP ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• VIDEO IN; NTSC color bar signal</li> <li>• PAUSE (STANDBY) mode</li> </ul>	<p>TP303/VA-16</p>  <p>TRIG; TP110/VA-16</p> <p>A = 100% refer B = <math>90 \pm 2.5\%</math> C = <math>152.5 \pm 12.5\%</math></p>	<ul style="list-style-type: none"> <li>● RV301/VA-16 LOW CLIP</li> <li>● RV303/VA-16 HIGH CLIP</li> </ul>

## 12-19. Y SECONDARY DISTORTION ADJUSTMENT

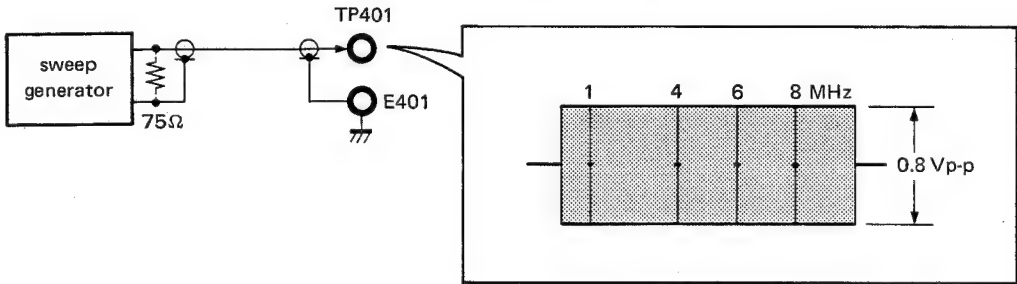
machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• VIDEO IN; EIA video signal</li> <li>• Disconnect the CN201/VA-16</li> <li>• Temporarily set the RV402 and RV404/VA-16 to fully CCW position.</li> <li>• REC mode</li> </ul>	<p>TP402/VA-16 (CH-A) TP403/VA-16 (CH-B)</p> <p>SPECTRUM ANALYZER (via oscilloscope)</p>  <p>Minimize the 9 MHz spectrum.</p>	<ul style="list-style-type: none"> <li>● RV409/VA-16 (CH-1)</li> <li>● RV410/VA-16 (CH-2)</li> </ul>

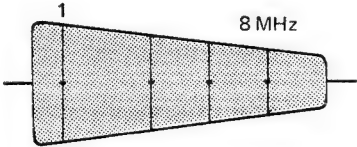
After completing this adjustment, the 12-20. Y Record Current Frequency Response Adjustment is required.



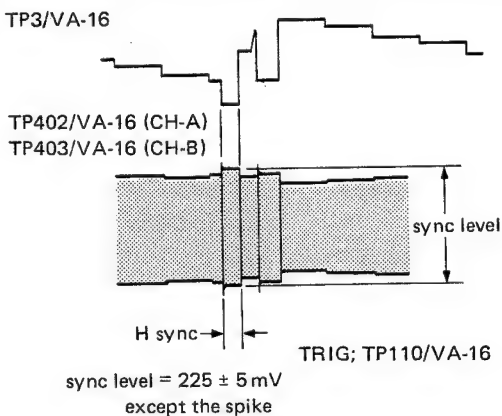
12-20. Y RECORD CURRENT FREQUENCY RESPONSE ADJUSTMENT

When this adjustment is performed, connect the sweep signal to TP401/VA-16 board.

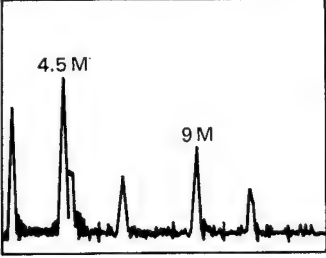


machine conditions for adjustment	spec.	adjustment						
<ul style="list-style-type: none"><li>● VIDEO IN; EIA video signal</li><li>● Short TP8 and E401/VA-16</li><li>● Connect the sweep signal as above-mentioned.</li><li>● REC mode.</li></ul>	<p>TP402/VA-16 (CH-A) TP403/VA-16 (CH-B)</p> <div></div> <table border="1"><thead><tr><th>Frequency</th><th>Level</th></tr></thead><tbody><tr><td>1 MHz</td><td>100% refer</td></tr><tr><td>8 MHz</td><td>55 ± 1.7%</td></tr></tbody></table>	Frequency	Level	1 MHz	100% refer	8 MHz	55 ± 1.7%	<ul style="list-style-type: none"><li>● RV402/VA-16 (CH-A)</li><li>● RV404/VA-16 (CH-B)</li></ul>
Frequency	Level							
1 MHz	100% refer							
8 MHz	55 ± 1.7%							

## 12-21. Y RECORD CURRENT ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• VIDEO IN; EIA video signal</li> <li>• REC mode</li> </ul>	<p>TP3/VA-16</p>  <p>TP402/VA-16 (CH-A) TP403/VA-16 (CH-B)</p> <p>sync level</p> <p>H sync</p> <p>TRIG; TP110/VA-16</p> <p>sync level = <math>225 \pm 5</math> mV except the spike</p>	<ul style="list-style-type: none"> <li>• RV401/VA-16 (CH-A)</li> <li>• RV403/VA-16 (CH-B)</li> </ul> <p>Adjust CH-A and CH-B alternately until both channels specifications are satisfied at a same time.</p>

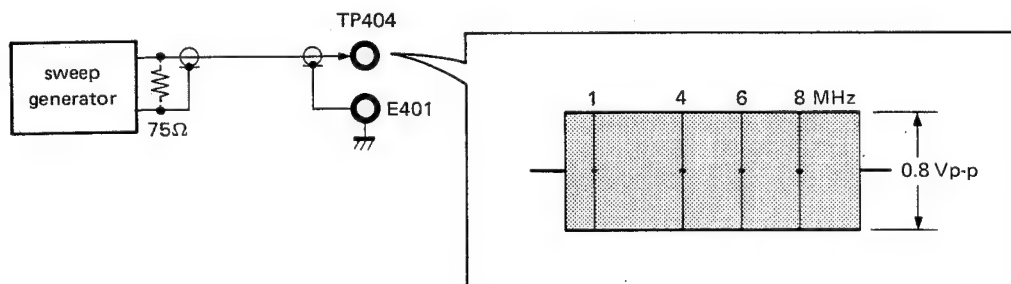
## 12-22. C SECONDARY DISTORTION ADJUSTMENT

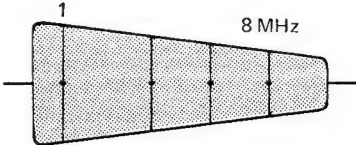
machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• VIDEO IN; EIA video signal</li> <li>• Disconnect the CN202/VA-16.</li> <li>• Temporarily set the RV406 and RV408/VA-16 to fully CCW position.</li> <li>• REC mode.</li> </ul>	<p>TP405/VA-16 (CH-A) TP406/VA-16 (CH-B)</p> <p>SPECTRUM ANALYZER (via oscilloscope)</p>  <p>Minimize the 9 MHz spectrum.</p>	<ul style="list-style-type: none"> <li>• RV411/VA-16 (CH-A)</li> <li>• RV412/VA-16 (CH-B)</li> </ul>

After completing this adjustment, the 12-23. C Record Current Frequency Response Adjustment is required.

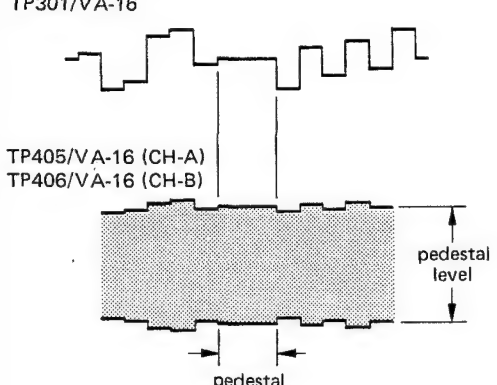
## 12-23. C RECORD CURRENT FREQUENCY RESPONSE ADJUSTMENT

When this adjustment is performed, connect the sweep signal to TP404/VA-16 board.

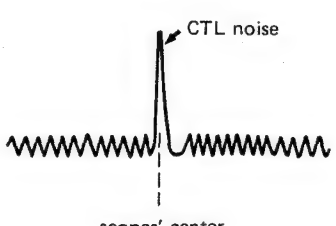
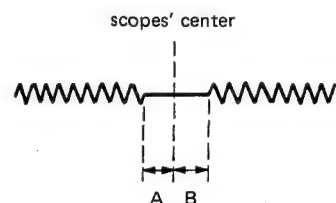


machine conditions for adjustment	spec.	adjustment						
<ul style="list-style-type: none"><li>• VIDEO IN; EIA video signal</li><li>• Short TP305 and E402/VA-16</li><li>• Connect the sweep signal as above-mentioned.</li><li>• REC mode.</li></ul>	<p>TP405/VA-16 (CH-A) TP406/VA-16 (CH-B)</p> <div></div> <table><thead><tr><th>Frequency</th><th>Level</th></tr></thead><tbody><tr><td>1 MHz</td><td>100% refer</td></tr><tr><td>8 MHz</td><td>48.3 ± 1.7%</td></tr></tbody></table>	Frequency	Level	1 MHz	100% refer	8 MHz	48.3 ± 1.7%	<ul style="list-style-type: none"><li>● RV406/VA-16 (CH-A)</li><li>● RV408/VA-16 (CH-B)</li></ul>
Frequency	Level							
1 MHz	100% refer							
8 MHz	48.3 ± 1.7%							

## 12-24. C RECORD CURRENT ADJUSTMENT

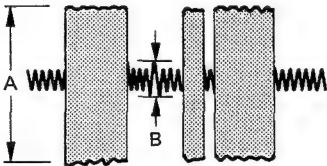
machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• VIDEO IN; EIA video signal</li> <li>• REC mode</li> </ul>	<p>TP301/VA-16</p>  <p>TP405/VA-16 (CH-A) TP406/VA-16 (CH-B)</p> <p>pedestal level</p> <p>pedestal</p> <p>TRIG; TP110/VA-16 pedestal level = <math>225 \pm 5</math> mV</p>	<ul style="list-style-type: none"> <li>• RV405/VA-16 (CH-A)</li> <li>• RV407/VA-16 (CH-B)</li> </ul>

## 12-25. VIDEO CONFIDENCE CTL MUTE ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• VIDEO IN; EIA video signal</li> <li>• REC mode</li> </ul>	<p>TP452/VA-16</p>  <p>CTL noise</p> <p>scopes' center</p> <p>TRIG; TP11/SS-23</p> <p>In the event the CTL noise is not appeared on scope, turn the RV451/AL-6 to CW or CCW direction.</p>	<p>Adjust the scope horizontal position so that the CTL noise is located in center scale.</p>
	<p>TP451/VA-16</p>  <p>scopes' center</p> <p>A B</p> <p>A = B</p>	<ul style="list-style-type: none"> <li>• RV451/AL-6</li> </ul>

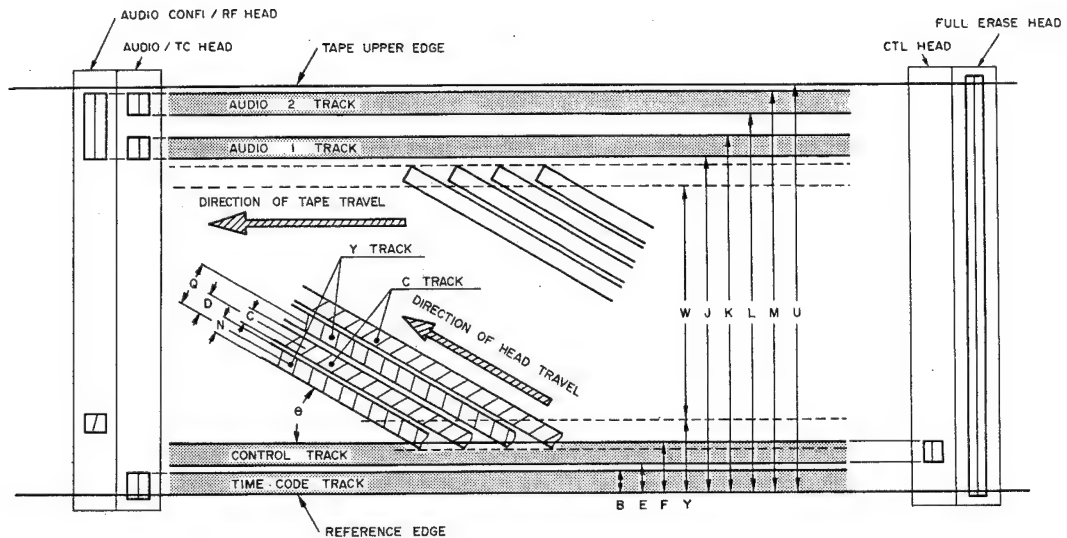


## 12-26. VIDEO CONFIDENCE LEVEL ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
<ul style="list-style-type: none"> <li>• VIDEO IN; EIA video signal</li> <li>• Disconnect the CN206/VA-16.</li> <li>• REC mode.</li> </ul>	<p>TP453/VA-16</p>  <p>TRIG; TP11/SS-23</p> <p>A = more than 6.5 Vp-p B = less than 2.2 Vp-p</p>	<p>RV451/VA-16</p>

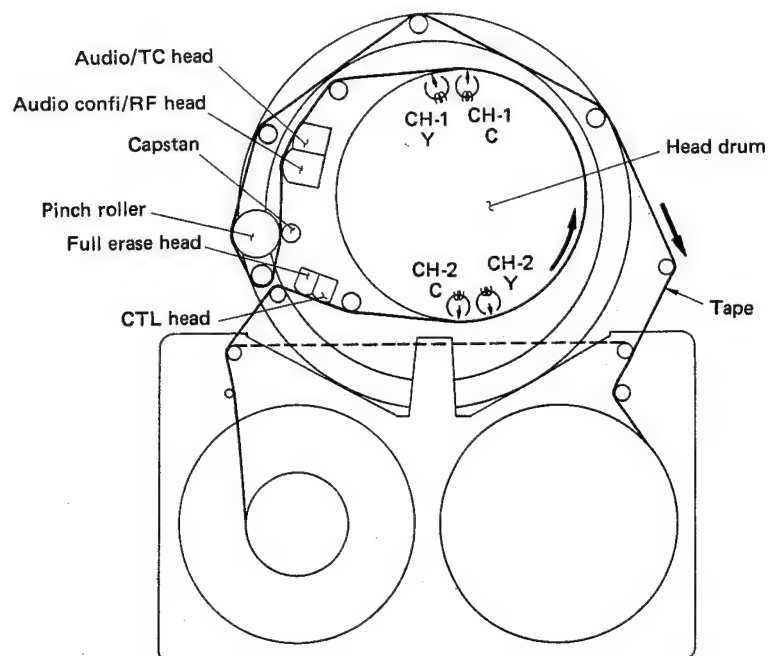
## SECTION 13 BLOCK DIAGRAM

### TAPE PATTERN

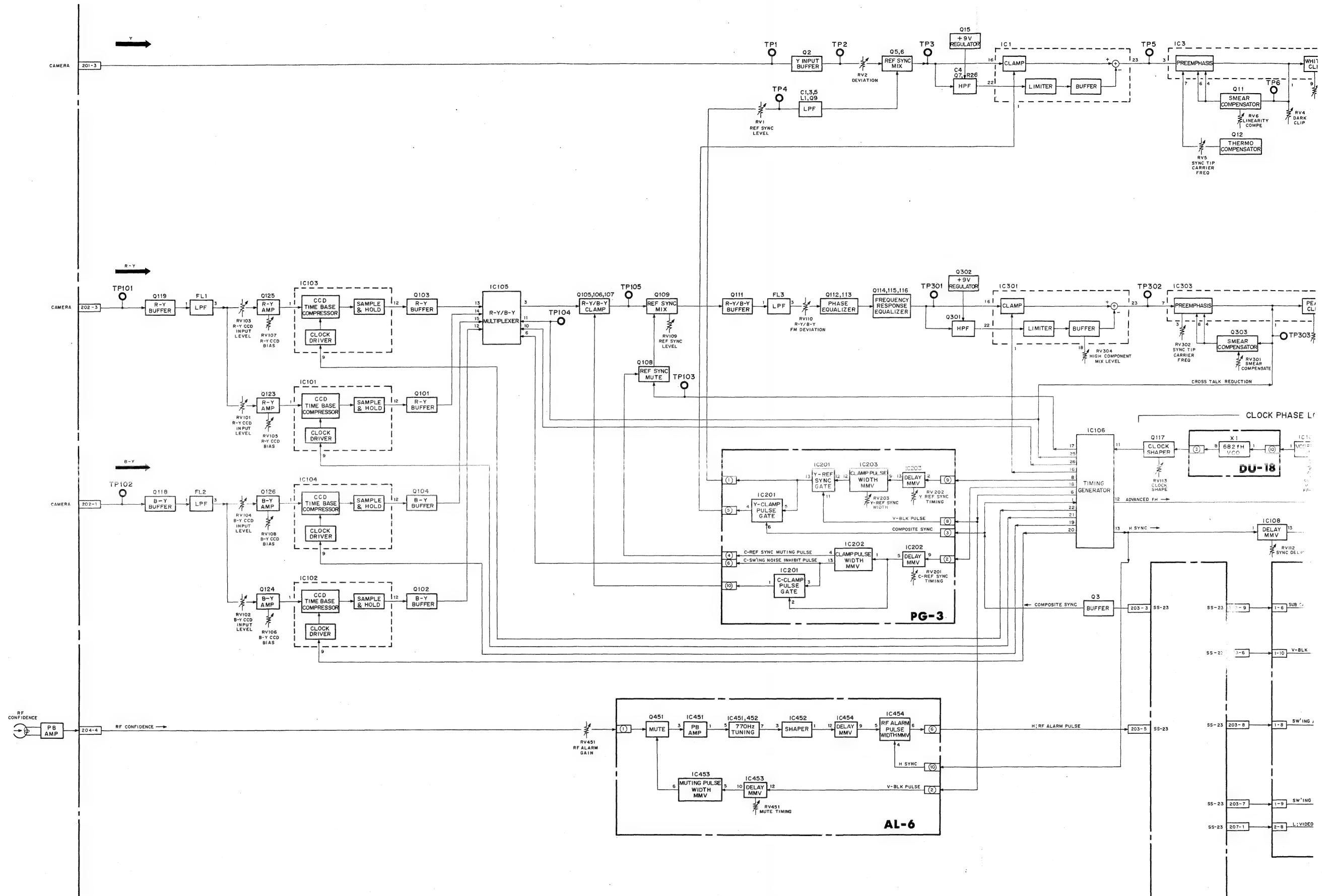


Unit: mm			
B : Time Code Track Upper Edge	0.4	L : Audio 2 Track Lower Edge	11.85
C : C Track Width	0.073	M : Audio 2 Track Upper Edge	12.45
D : Y-C Track Pitch	0.0805	N : Y Track Width	0.073
E : Control Track Lower Edge	0.7	Q : Video Track Pitch	0.161
F : Control Track Upper Edge	1.1	U : Tape Width	12.7
J : Audio 1 Track Lower Edge	10.85	W : Video Area Effective Width	9.384
K : Audio 1 Track Upper Edge	11.45	Y : Lower Limit of W	1.248
		Θ : Track Angle	4.679°

### TAPE TRANSPORT



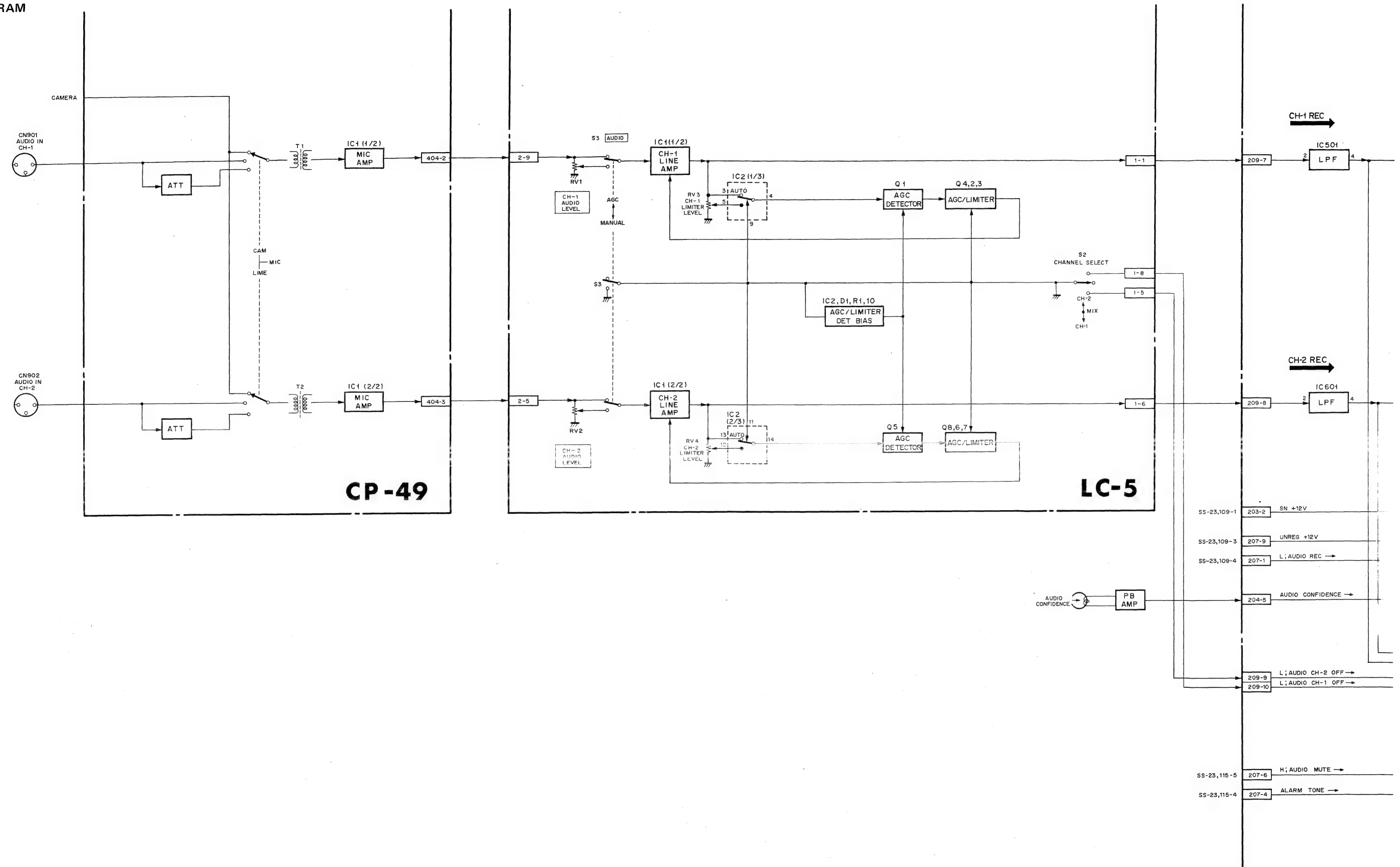
## VIDEO BLOCK DIAGRAM

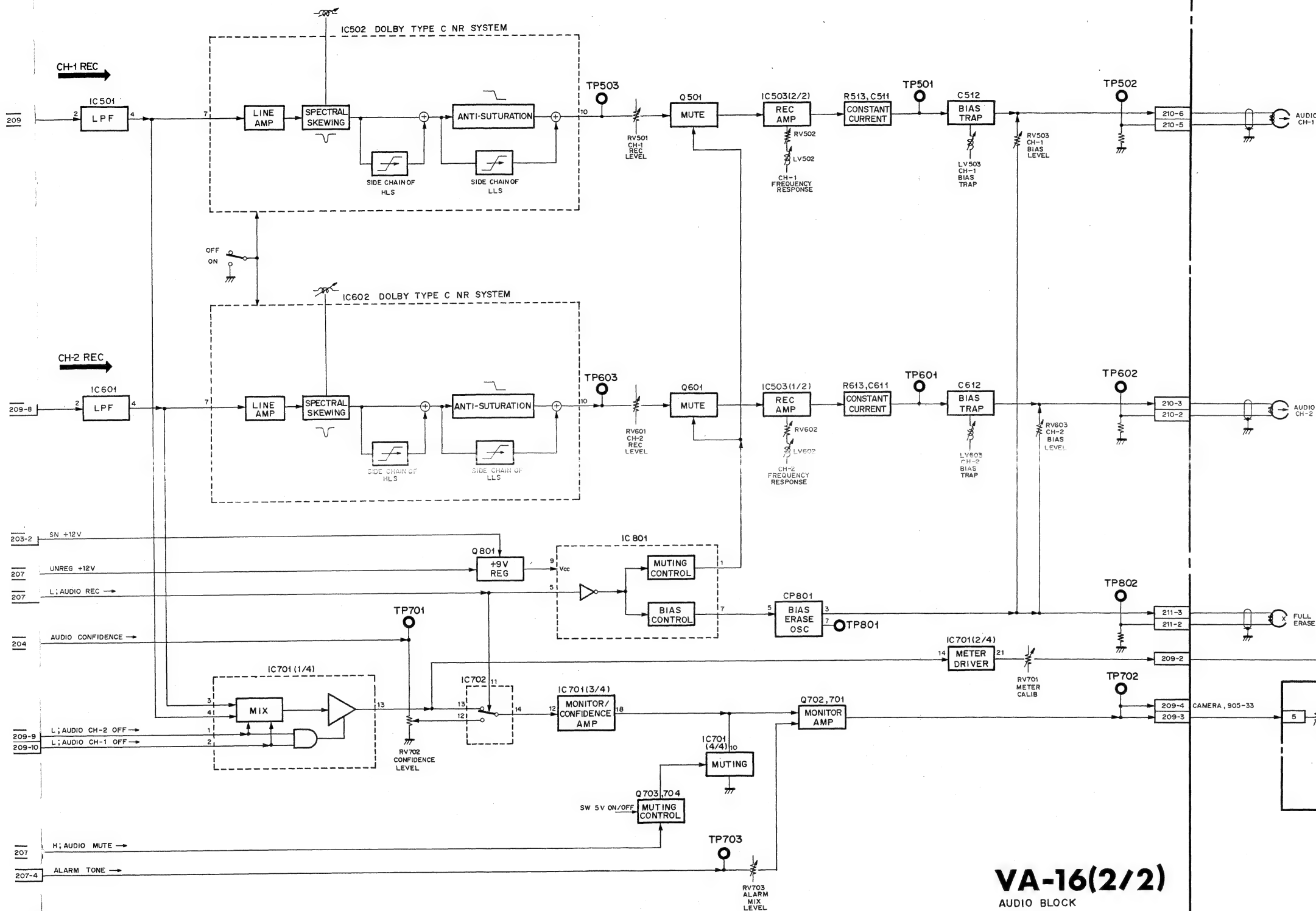


VIDEO	VIDEO
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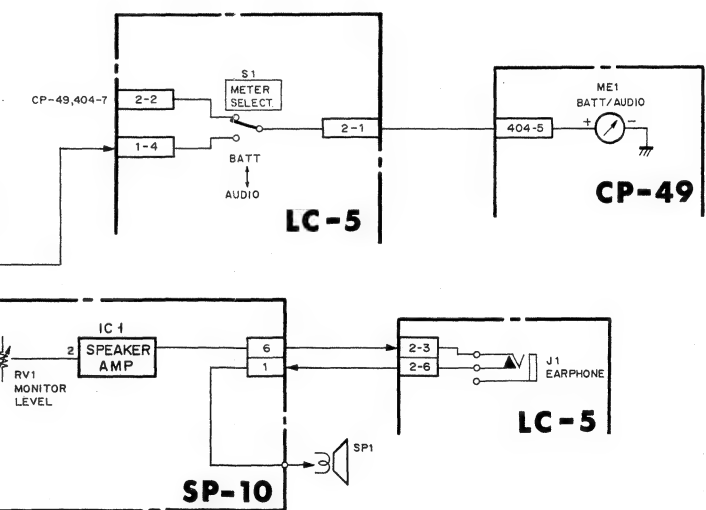


AUDIO BLOCK DIAGRAM



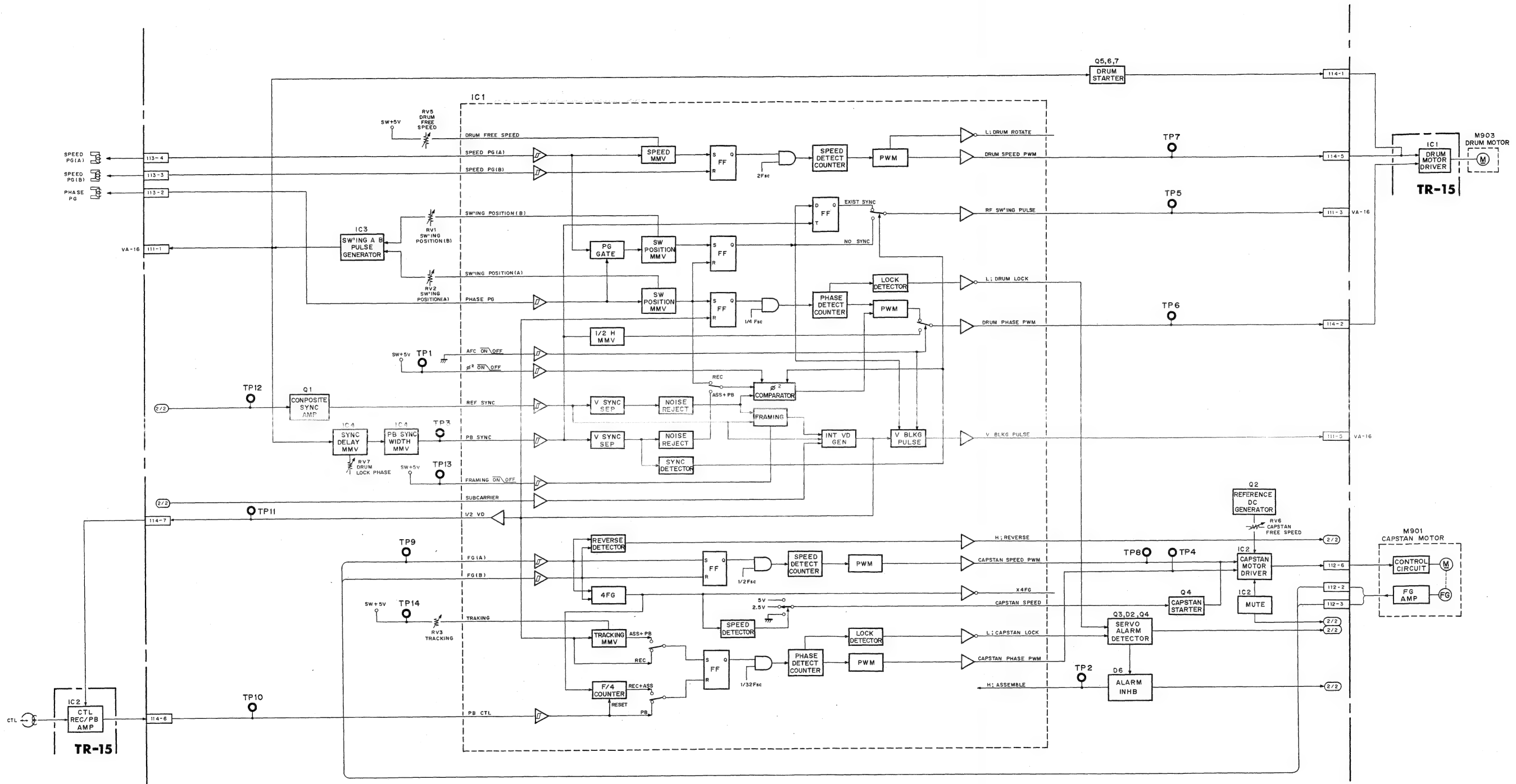


VA-16(2/2)  
AUDIO BLOCK



SERVO      SERVO

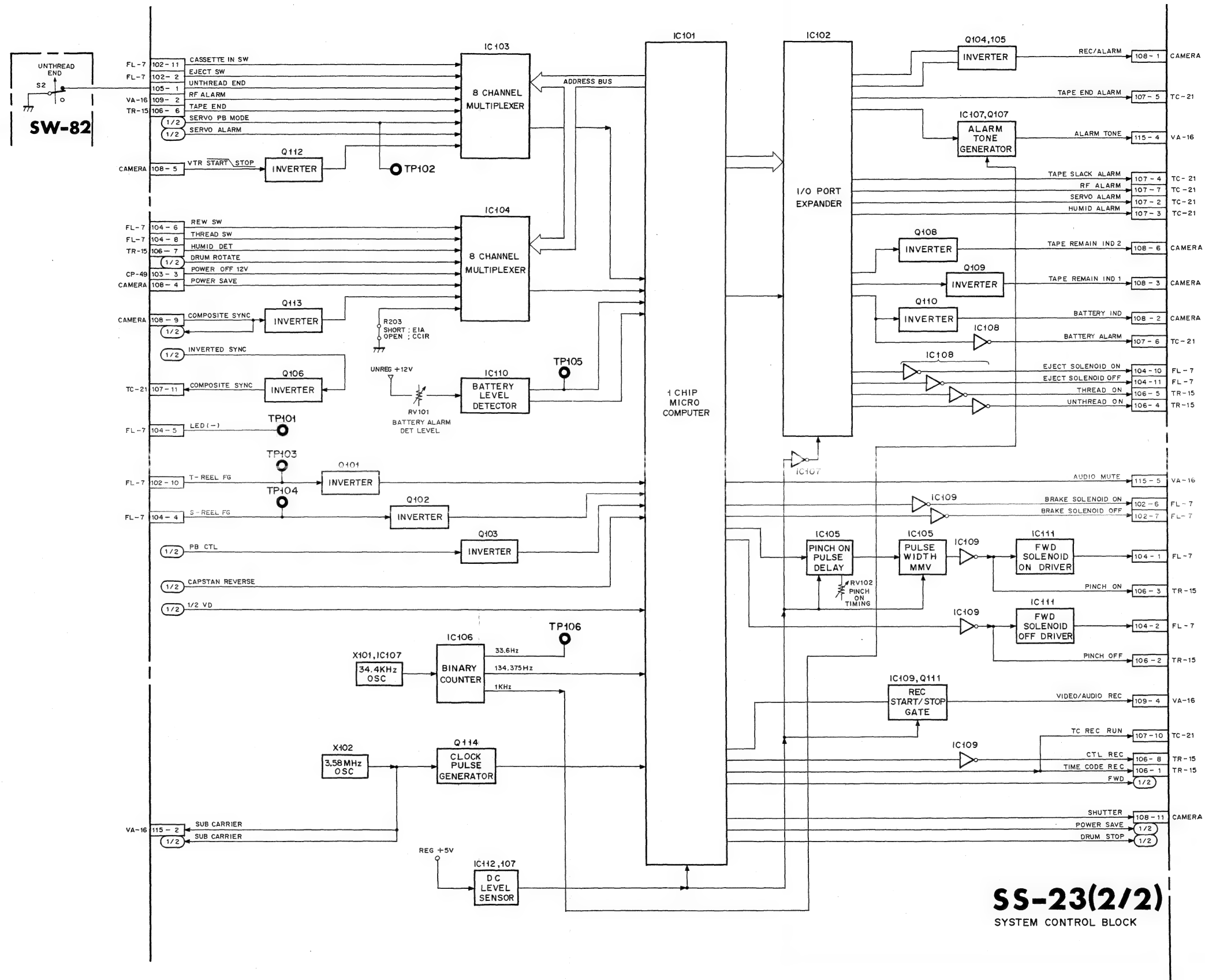
## SERVO BLOCK DIAGRAM



**SS-23(1/2)**

SERVO BLOCK

SYSTEM CONTROL BLOCK DIAGRAM





## SECTION 14 SEMICONDUCTOR ELECTRODES

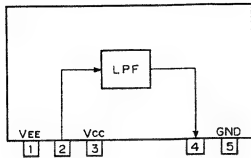
### SEMICONDUCTOR ELECTRODES

Type	Page
<b>IC</b>	
AFL25F15000G1	14-2
BX1047	14-2
BX1058	14-3
BX1063	14-2
BX1064	14-2
BX1066	14-2
BX1069	14-3
BX1071	14-2
BX1152	14-3
BX1154	14-2
BX1155	14-2
BX1196	14-2
BX3997	14-3
BX3998	14-2
CX184	14-3
CX564	14-12
CX23051	14-4
CX7907A	14-5
HD14046BP	14-7
HD14538BP	14-7
M54543L	14-7
MB84053B	14-7
MBM27C32A-25	14-7
MBM27C32A-30	14-7
NJM2903D	14-7
NJM4558D	14-8
NJM4558M	14-8
NJM4560D	14-8
SM6430C	14-8
SN74LS221N	14-8
TA7060AP	14-8
TC4013BF	14-8
TC4017BF	14-8
TC4020BP	14-8
TC4030BF	14-8
TC4049BF	14-10
TC4051BF	14-9
TC4051BP	14-9
TC4053BP	14-7
TC4056BF	14-9
TC4069UBF	14-9
TC4069UBP	14-9
TC4071BF	14-9
TC4081BF	14-9
TC40H002P	14-9

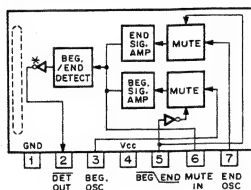
Type	Page
TC40H390F	14-9
TC4512BP	14-9
TC4538BF	14-7
TD62703P	14-10
TL062CPS	14-10
TL8605P-S	14-10
$\mu$ PC143**H	14-10
$\mu$ PC4558C	14-8
$\mu$ PC78L**	14-10
$\mu$ PD8243C	14-10
<b>Transistor</b>	
2SA1026	14-11
2SA1027R	14-11
2SA1162	14-11
2SA1206	14-11
2SA733	14-11
2SA812	14-11
2SA844	14-11
2SC1364	14-11
2SC1623	14-11
2SC2712	14-11
2SC2785	14-11
2SC2901	14-11
2SC403C	14-11
2SC403SP	14-11
2SD637	14-11
2SD774	14-11
2SD789	14-11
2SK270-GR	14-11
2SK43	14-11
PH103-2L	14-11
<b>Diode</b>	
1S2835	14-11
1S2837	14-11
1SS123	14-11
EBR3402S	14-11
ESAC33-02CS	14-11
MA151WA	14-11
MA151WK	14-11
MA153	14-11
SE304-2K	14-11

# SEMICONDUCTOR ELECTRODES

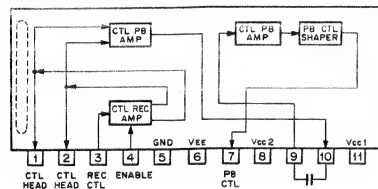
AFL25F1500G1 (MURATA)  
BX1343A (SONY)  
ACTIVE LOW-PASS FILTER  
—IMPRINTED SIDE VIEW—



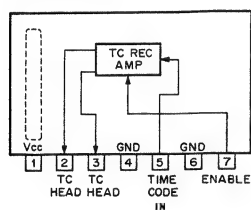
BX1047 (SONY)  
TAPE BEGINNING/END DETECTOR  
—REAR VIEW—



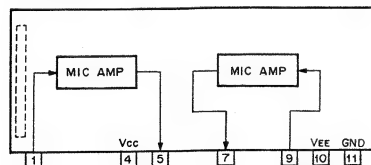
BX1063 (SONY)  
CTL REC/PB AMP  
—REAR VIEW—



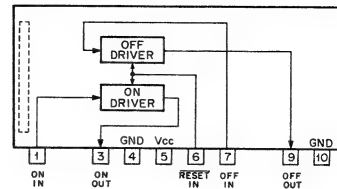
BX1064 (SONY)  
TIME CODE REC AMP  
—REAR VIEW—



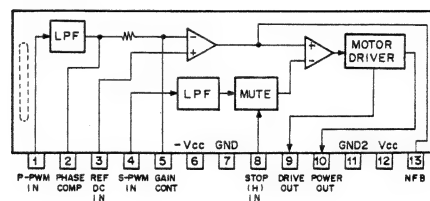
BX1066 (SONY)  
AUDIO MIC AMP  
—REAR VIEW—



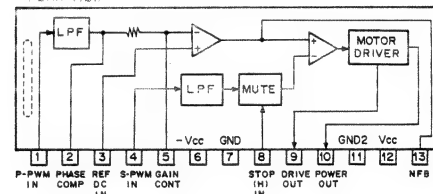
BX1071 (SONY)  
PLUNGER DRIVER  
—REAR VIEW—



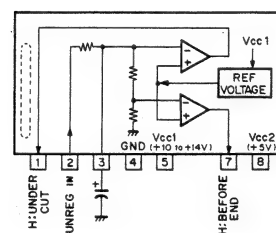
BX1154 (SONY)  
DRUM PWM  
—REAR VIEW—



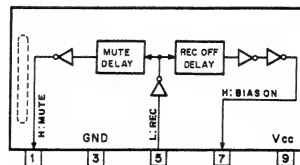
BX1155 (SONY)  
CAPSTAN PWM  
—REAR VIEW—



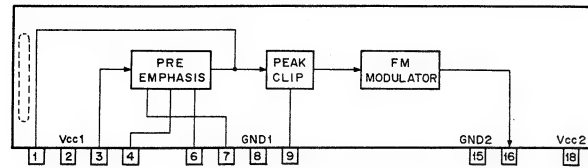
BX1196 (SONY)  
BATTERY LEVEL DETECTOR  
—REAR VIEW—



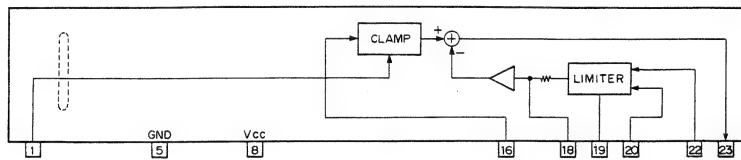
BX3998 (SONY)  
AUDIO MUTE/BIAS CONTROL  
—REAR VIEW—



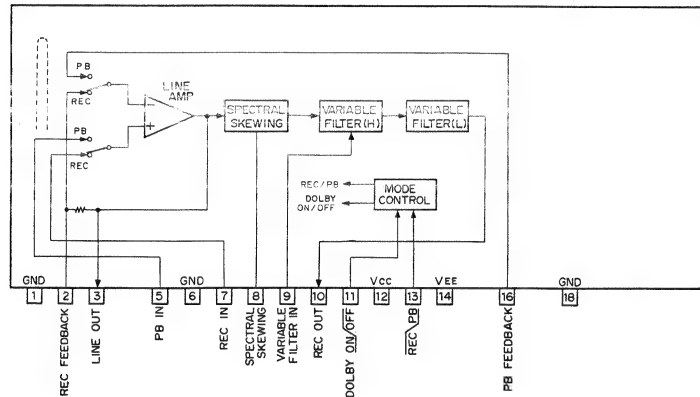
**BX1058 (SONY)**  
PRE-EMPHASIS/PEAK CLIP/FM MODULATOR  
— REAR VIEW —



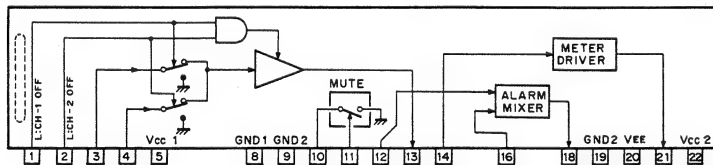
**BX1069 (SONY)**  
VIDEO CLAMP / HIGH FREQUENCY COMPONENT PRE-EMPHASIS  
— REAR VIEW —



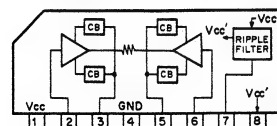
**BX1152 (SONY)**  
DOLBY (C TYPE) NOISE REDUCTION SYSTEM  
— REAR VIEW —



**BX3997 (SONY)**  
CHANNEL SELECT AND MONITOR AMP  
— REAR VIEW —

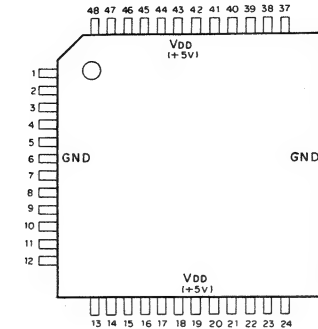


**CX184 (SONY)**  
AUDIO POWER AMP / RIPPLE FILTER  
— SIDE VIEW —



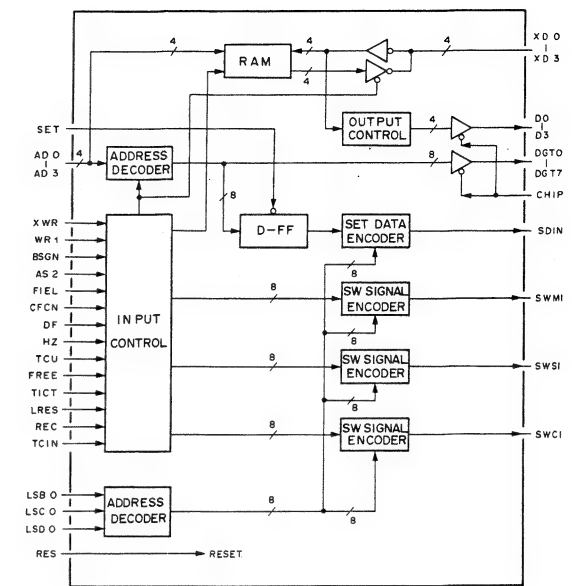
CB; CURRENT BUFFER

**CX23051 (SONY) FLAT PACKAGE**  
C-MOS TIME CODE GENERATOR (CX7907A) CONTROLLER  
— TOP VIEW —



Pin No.	IN	OUT	SYMBOL	Pin No.	IN	OUT	SYMBOL	Pin No.	IN	OUT	SYMBOL	Pin No.	IN	OUT	SYMBOL
1			DO	13			LRES	25			XD2	37			DGT7
2			REC	14			BSGN	26			XD3	38			DGT6
3			RES	15			WR1	27			SWM1	39			DGT5
4			TCIN	16			AS2	28			SWC1	40			DGT4
5			CFCN	17			TICT	29			SWS1	41			DGT3
6			GND	18			XD1	30			SDIN	42			DGT2
7			FIEL	19			VDD	31			GND	43			VDD
8			HZ	20			XD0	32			AD0	44			DGT1
9			DF	21			XWR	33			AD1	45			DGT0
10			SET	22			LSB0	34			AD2	46			D3
11			FREE	23			LSC0	35			AD3	47			D2
12			TCU	24			LSD0	36			CHIP	48			D1

32	AD0		XD0	18	AD0		ADDRESS DATA INPUT
33	AD1		XD1	19	AD1		
34	AD2		XD2	20	AD2		
35	AD3		XD3	21	AD3		
10	SET		DO	1	DO		DISPLAY DATA OUTPUT
21	XWR		D1	48	D1		
15	WR1		D2	47	D2		
14	BSGN		D3	46	D3		
16	AS2		DF	45	DF		H: DROP FRAME/L: NDF INPUT
7	FIEL		DGT0	44	DGT0		DIGIT DATA OUTPUT
5	CFCN		DGT1	43	DGT1		
9	DF		DGT2	42	DGT2		
8	HZ		DGT3	41	DGT3		
12	TCU		DGT4	40	DGT4		
11	FREE		DGT5	39	DGT5		
17	TICT		DGT6	38	DGT6		
15	LRES		DGT7	37	DGT7		
2	REC		SDIN	30	SDIN		LTC SYNCHRONOUS SIGNAL INPUT
4	TCIN		SWM1	27	SWM1		
22	LSB0		SWS1	29	SWS1		
23	LSC0		SWC1	28	SWC1		
24	LSD0						
36	CHIP						
3	RES						

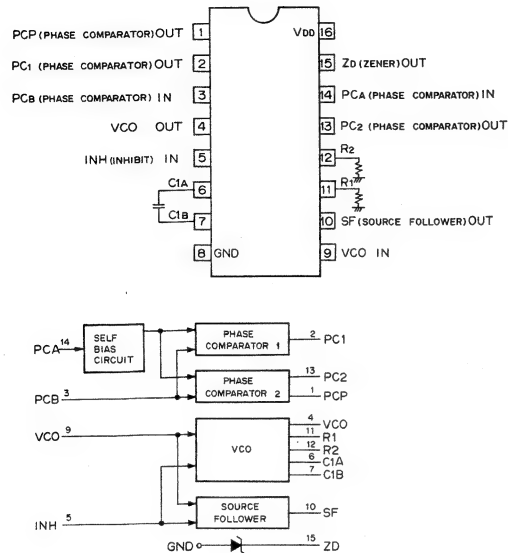


## SEMICONDUCTOR ELECTRODES

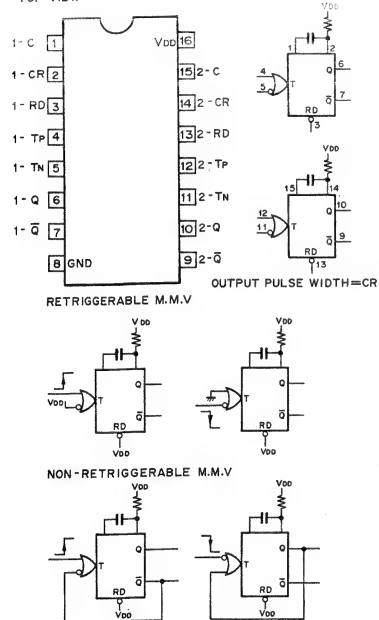
14-6

# SEMICONDUCTOR ELECTRODES

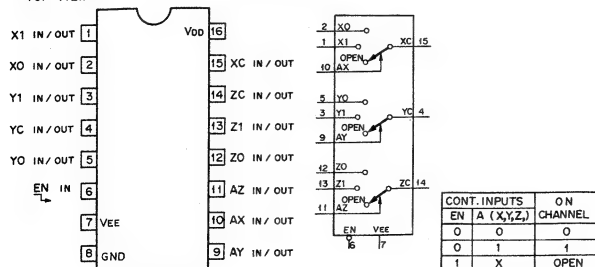
HD14046BP (HITACHI)  
C-MOS PHASE LOCKED LOOP  
—TOP VIEW—



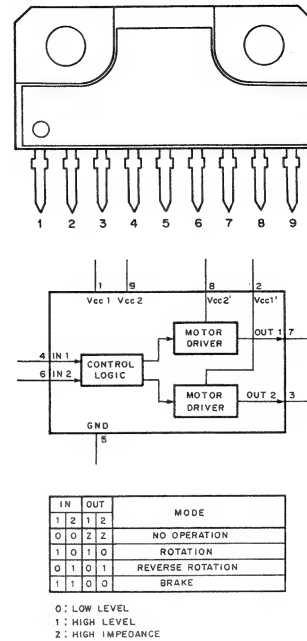
HD14538BP (HITACHI)  
TC4538BF (TOSHIBA)  
C-MOS DUAL RETRIGGERABLE/NON-RETRIGGERABLE  
MONOSTABLE MULTIVIBRATOR  
—TOP VIEW—



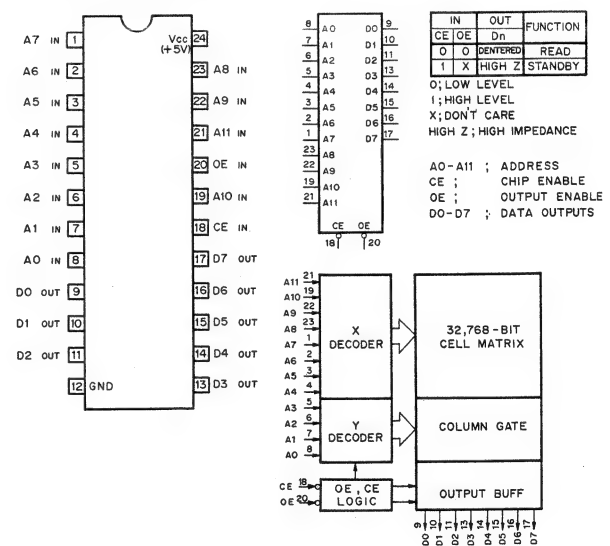
MB84053B (MOTOROLA)  
TC4053BP (TOSHIBA)  
C-MOS 2-CHANNEL MULTIPLEXER / DEMULTIPLEXER  
—TOP VIEW—



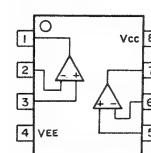
M54543L (MITSUBISHI)  
BI-DIRECTIONAL MOTOR DRIVER  
—SIDE VIEW—



MBM27C32A-25  
MBM27C32A-30  
32K (4K-8) UV ERASABLE PROM  
—TOP VIEW—

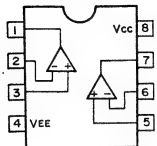


NJM2903D (JRC)  
OPERATIONAL AMPLIFIER  
—TOP VIEW—

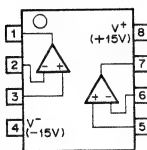


# SEMICONDUCTOR ELECTRODES

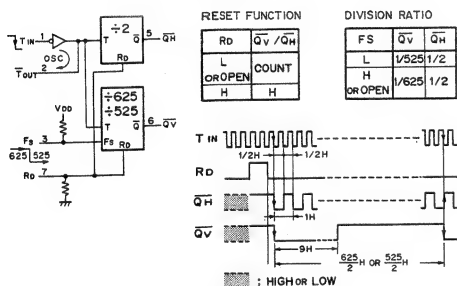
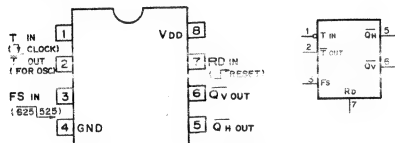
NJM4558D (JRC)  
NJM4558M (JRC)  
μPC4558C (NEC)  
OPERATIONAL AMPLIFIER  
-TOP VIEW-



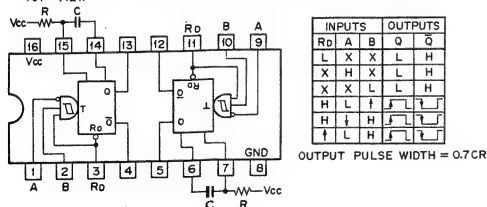
NJM4560D (JRC)  
OPERATIONAL AMPLIFIER  
-TOP VIEW-



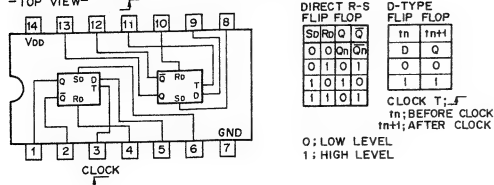
SM6430C (NPC)  
C-MOS OSC, 1/2 & 1/525 / 1/625 DIVIDER  
-TOP VIEW-



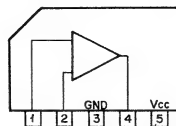
SN74LS221N (TI)  
TTL MONOSTABLE MULTIVIBRATOR WITH SCHMITT TRIGGER INPUT  
-TOP VIEW-



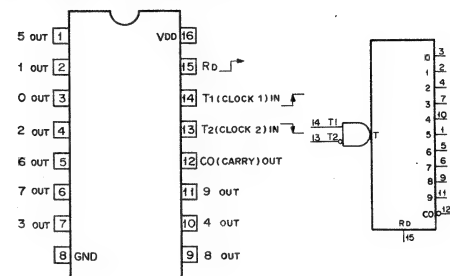
TC4013BF (TOSHIBA)  
C-MOS D-TYPE FLIP FLOP WITH DIRECT SET / RESET  
-TOP VIEW-



TA7060AP (TOSHIBA)  
LINEAR AMP  
-SIDE VIEW-

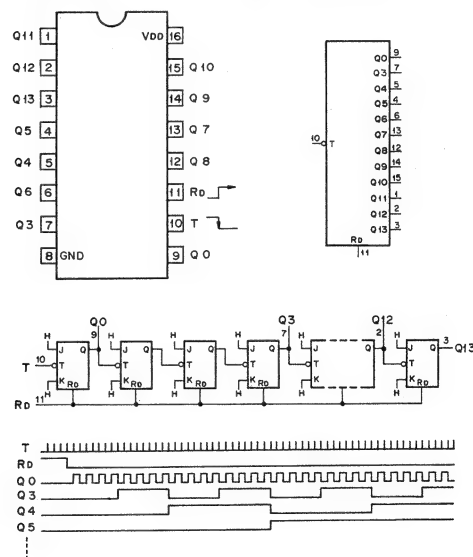


TC4017BE  
C-MOS DECADE COUNTER/DIVIDER  
-TOP VIEW-

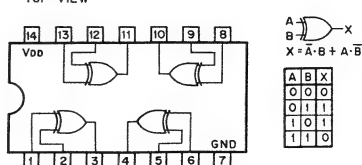


COUNT	INPUTS		OUTPUTS									
	RD	T=T1-T2	9	8	7	6	5	4	3	2	1	0
0	1	X	0	0	0	0	0	0	0	0	1	1
1	0	0	0	0	0	0	0	0	0	1	1	1
2	0	0	0	0	0	0	0	0	1	0	1	1
3	0	0	0	0	0	0	0	1	0	0	1	1
4	0	0	0	0	0	0	1	0	0	0	1	1
5	0	0	0	0	0	1	0	0	0	0	1	1
6	0	0	0	0	1	0	0	0	0	0	1	1
7	0	0	0	1	0	0	0	0	0	0	1	1
8	0	0	1	0	0	0	0	0	0	0	1	1
9	0	0	1	0	0	0	0	0	0	0	1	1
NO COUNT	0	1	1	0	0	0	0	0	0	0	0	0
			NO CHANGE									

TC4020BP (TOSHIBA)  
C-MOS 14-STAGE RIPPLE-CARRY BINARY COUNTER/DRIVER  
-TOP VIEW-

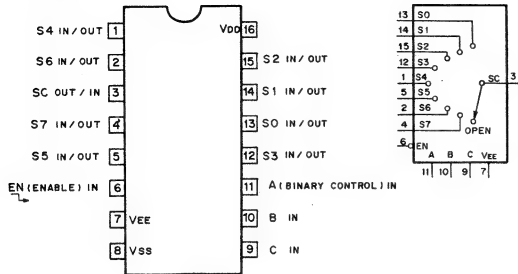


TC4030BF (TOSHIBA)  
C-MOS EXCLUSIVE OR GATE  
-TOP VIEW-



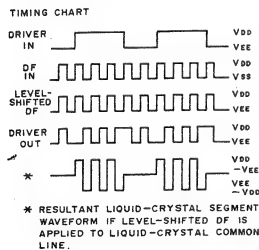
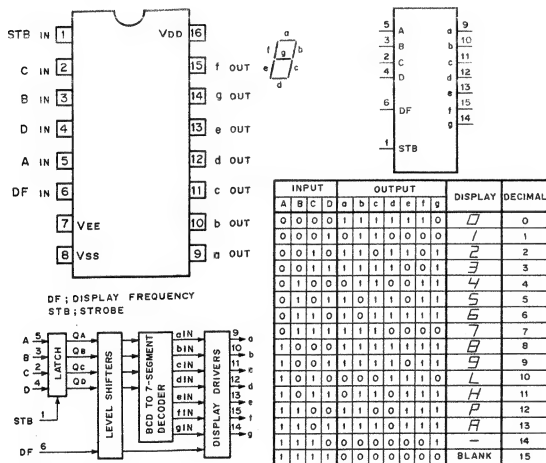
# SEMICONDUCTOR ELECTRODES

**TC4051BF (TOSHIBA)**  
**TC4051BP (TOSHIBA)**  
 C-MOS 8-CHANNEL MULTIPLEXER/DEMULTIPLEXER  
 -TOP VIEW-

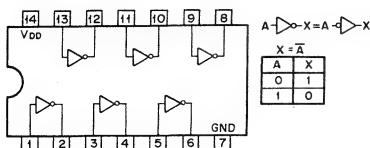


X: DON'T CARE  
 1: HIGH LEVEL  
 0: LOW LEVEL

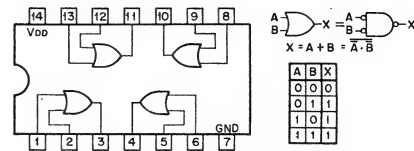
**TC4056BF (TOSHIBA)**  
 C-MOS BCD TO 7-SEGMENT DECODER/LIQUID-CRYSTAL DISPLAY DRIVERS WITH STROBED-LATCH FUNCTION  
 -TOP VIEW-



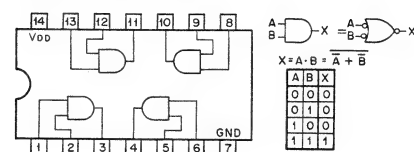
**TC4069UBF (TOSHIBA)**  
**TC4069UBP (TOSHIBA)**  
 C-MOS INVERTER  
 -TOP VIEW-



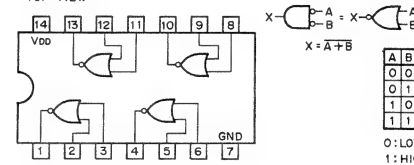
**TC4071BF (TOSHIBA)**  
 C-MOS 2-INPUT OR GATE  
 -TOP VIEW-



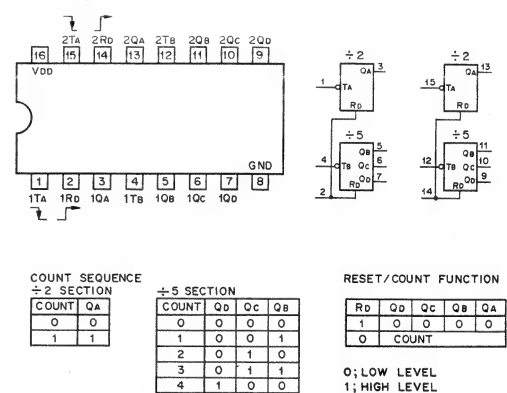
**TC4081BF (TOSHIBA)**  
 C-MOS 2-INPUT AND GATE  
 -TOP VIEW-



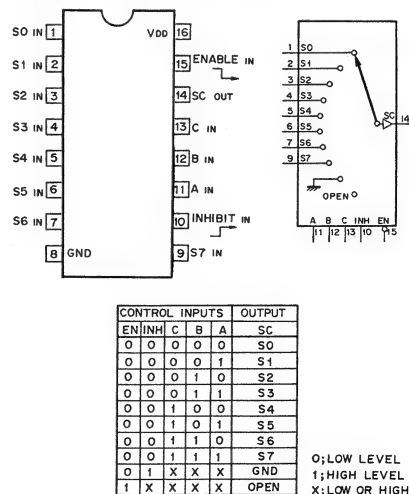
**TC40H002P (TOSHIBA)**  
 C-MOS 2-INPUT NOR GATE  
 -TOP VIEW-



**TC40H390F (TOSHIBA)**  
 C-MOS DIVIDE-BY-2 AND DIVIDE-BY-5 COUNTER  
 -TOP VIEW-

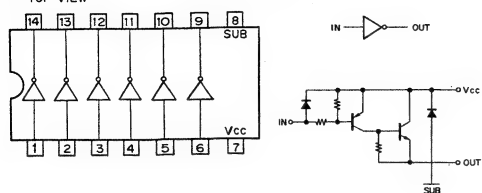


**TC4512BP (TOSHIBA)**  
 C-MOS 8-CHANNEL DATA SELECTOR/MULTIPLEXER  
 -TOP VIEW-

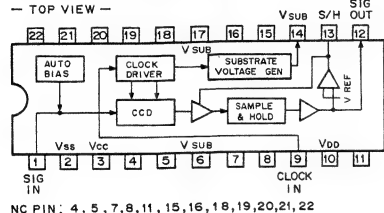


# SEMICONDUCTOR ELECTRODES

TD62703P (TOSHIBA)  
TRANSISTOR ARRAY, HIGH VOLTAGE INVERTING DRIVER  
— TOP VIEW —

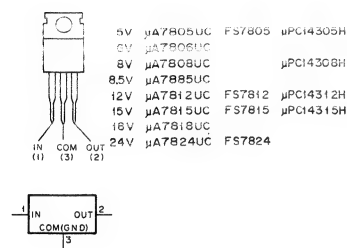


TL8605P-S (TOSHIBA)  
CCD ANALOG PROCESSING UNIT  
— TOP VIEW —

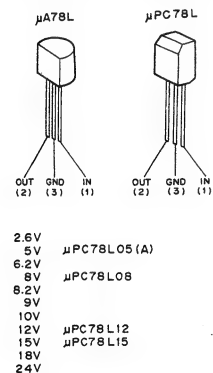


NC PIN: 4, 5, 7, 8, 11, 15, 16, 18, 19, 20, 21, 22

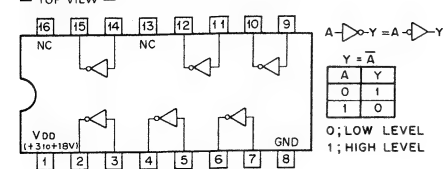
μPC1430QH (NEC)  
POSITIVE VOLTAGE REGULATOR (1A)



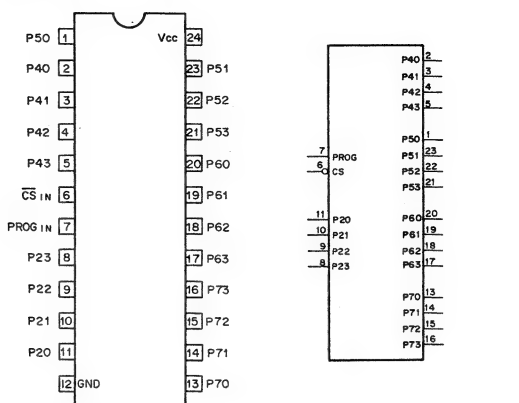
μPC78L□□ (NEC)  
POSITIVE VOLTAGE REGULATOR (100mA)



TC4049BF (TOSHIBA) FLAT PACKAGE  
C-MOS INVERTING TYPE BUFFER/CONVERTER  
— TOP VIEW —



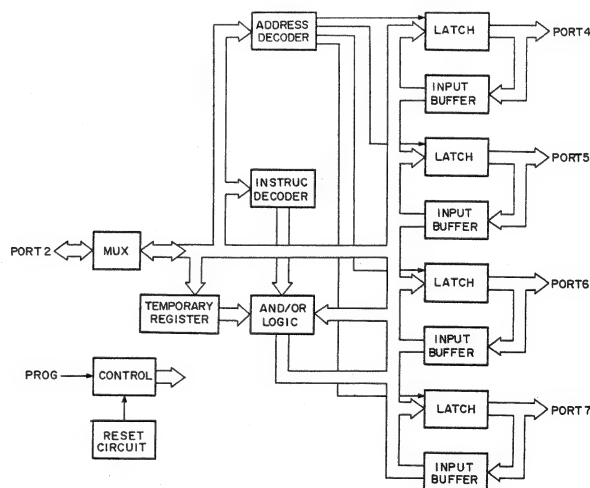
μPD8243C (NEC)  
N-MOS I/O PORT EXPANDER  
— TOP VIEW —



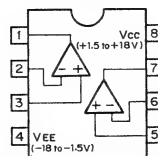
CONTROL AND PORT ADDRESSING

P23	P22	P21	P20	PORT	CONTROL
0	0	0	0	4	READ
0	0	0	1	5	
0	0	1	0	6	
0	0	1	1	7	
0	1	0	0	4	WRITE
0	1	0	1	5	
0	1	1	0	6	
0	1	1	1	7	
1	0	0	0	4	OR
1	0	0	1	5	
1	0	1	0	6	
1	0	1	1	7	
1	1	0	0	4	AND
1	1	0	1	5	
1	1	1	0	6	
1	1	1	1	7	

PROG; PROGRAM PULSE INPUT  
CS; CHIP SELECT INPUT  
P20~P23; I/O PORT 2 (FOR CPU)  
P40~P43; I/O PORT 4  
P50~P53; I/O PORT 5  
P60~P63; I/O PORT 6  
P70~P73; I/O PORT 7

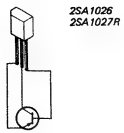


TL062CPS (TI) FLAT PACKAGE  
OPERATIONAL AMPLIFIER  
(JFET INPUT)  
— TOP VIEW —

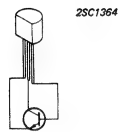
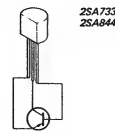
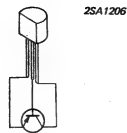
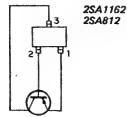




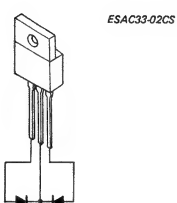
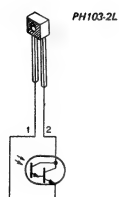
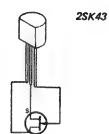
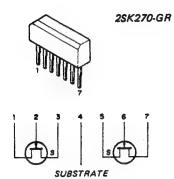
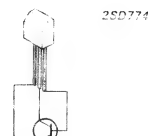
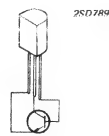
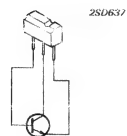
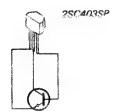
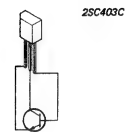
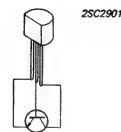
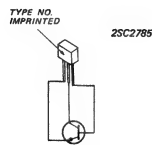
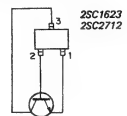
# SEMICONDUCTOR ELECTRODES



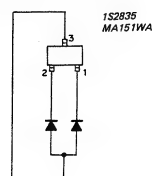
TOP VIEW (SCALE 4/1)



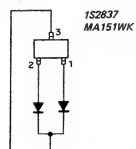
TOP VIEW (SCALE 4/1)



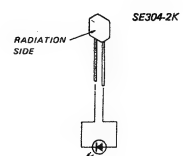
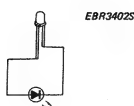
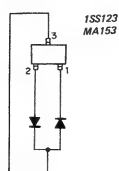
TOP VIEW (SCALE 4/1)



TOP VIEW (SCALE 4/1)

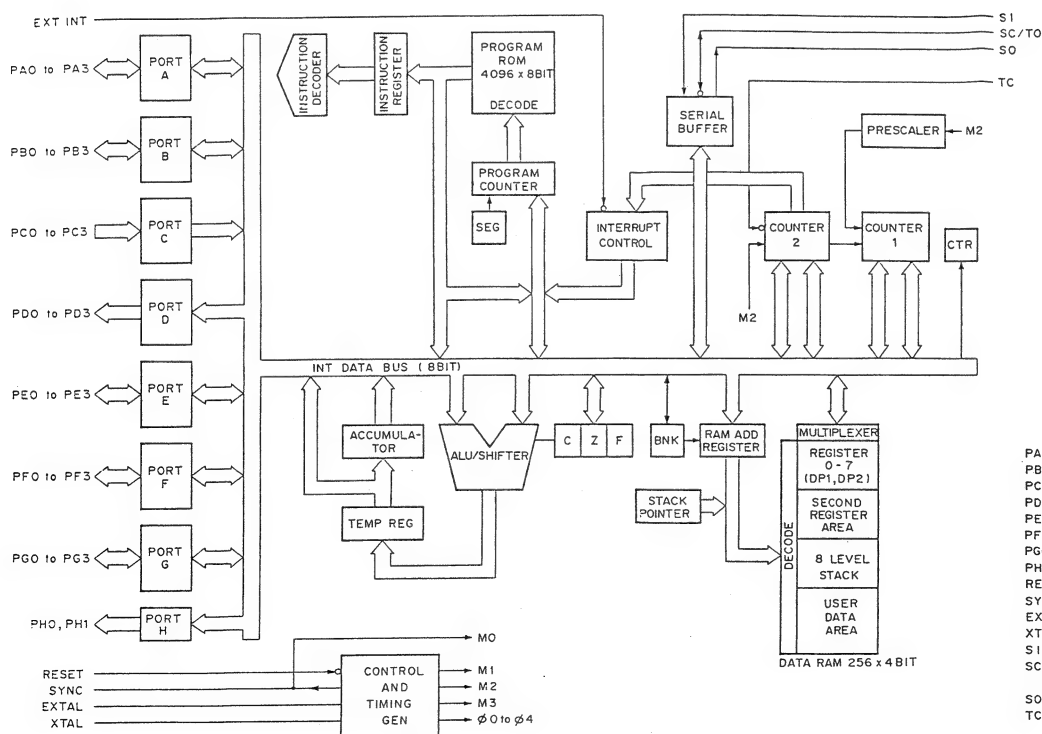
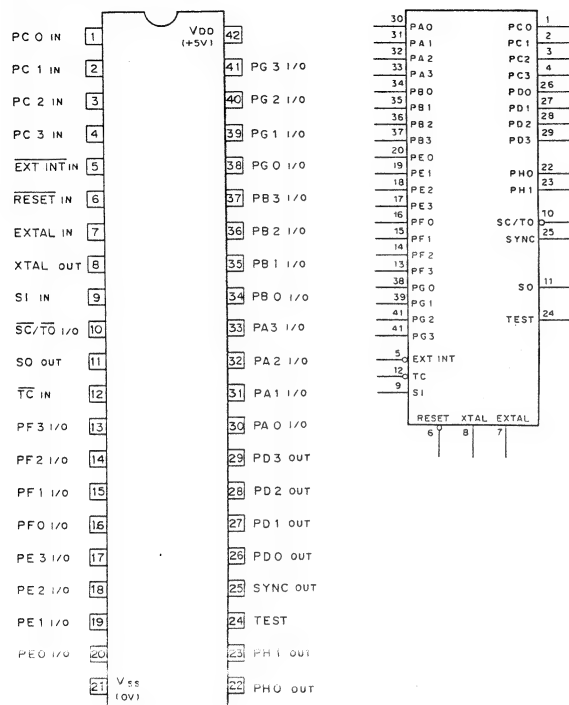


TOP VIEW (SCALE 4/1)



# SEMICONDUCTOR ELECTRODES

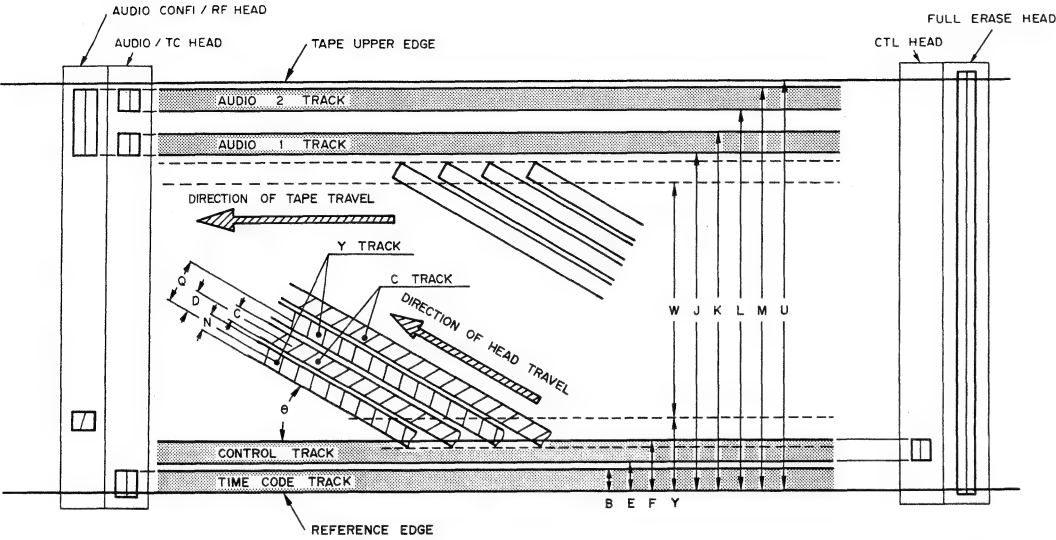
CX564 (SONY)  
N-MOS 4-BIT MICROPROCESSOR  
— TOP VIEW —



PA0 to PA3 ; PORT A 0 to PORT A 3 I/O  
PB0 to PB3 ; PORT B 0 to PORT B 3 I/O  
PC0 to PC3 ; PORT C 0 to PORT C 3 IN  
PD0 to PD3 ; PORT D 0 to PORT D 3 OUT  
PE0 to PE3 ; PORT E 0 to PORT E 3 I/O  
PF0 to PF3 ; PORT F 0 to PORT F 3 I/O  
PG0 to PG3 ; PORT G 0 to PORT G 3 I/O  
PH0, PH1 ; PORT H 0, PORT H 1 OUT  
RESET ; MPU RESET IN  
SYNC ; SYNCHRONOUS TIMING OUT  
EXTAL ; EXT CLOCK IN  
XTAL ; X'TAL  
S1 ; SERIAL BUFFER IN  
SC/TO ; SERIAL SHIFT CLOCK IN /TIMING OUT  
SO ; SERIAL BUFFER OUT  
TC ; EXT COUNT IN FOR INT TIMER/COUNTER

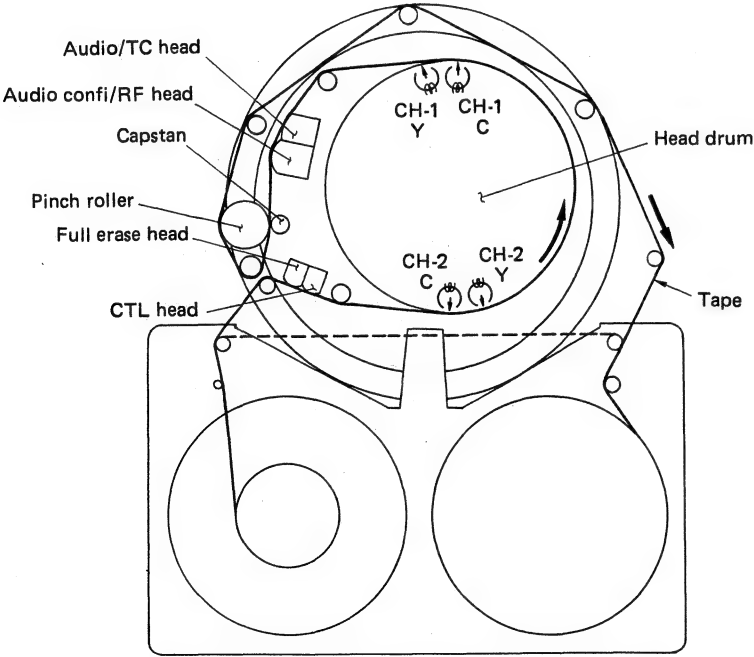
# SECTION 15 PRINTED WIRING BOARD AND SCHEMATIC DIAGRAM

## TAPE PATTERN

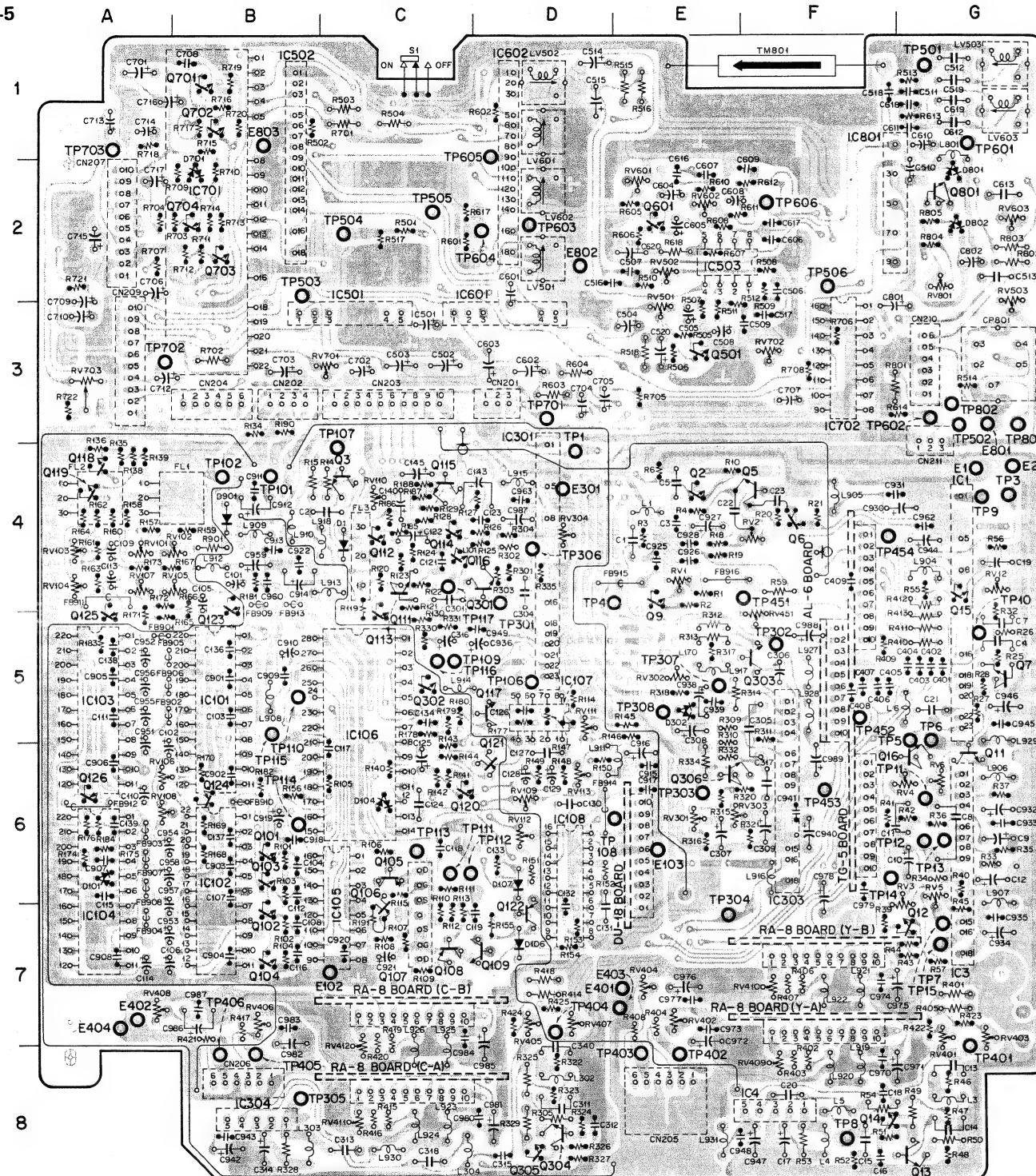


Unit: mm			
B : Time Code Track Upper Edge	0.4	L : Audio 2 Track Lower Edge	11.85
C : C Track Width	0.073	M : Audio 2 Track Upper Edge	12.45
D : Y—C Track Pitch	0.0805	N : Y Track Width	0.073
E : Control Track Lower Edge	0.7	Q : Video Track Pitch	0.161
F : Control Track Upper Edge	1.1	U : Tape Width	12.7
J : Audio 1 Track Lower Edge	10.85	W : Video Area Effective Width	9.384
K : Audio 1 Track Upper Edge	11.45	Y : Lower Limit of W	1.248
		Θ : Track Angle	4.679°

## TAPE TRANSPORT

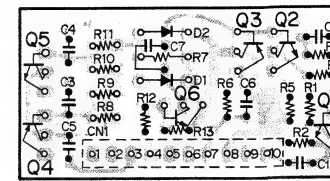


RA-8  
AL-6  
TG-5

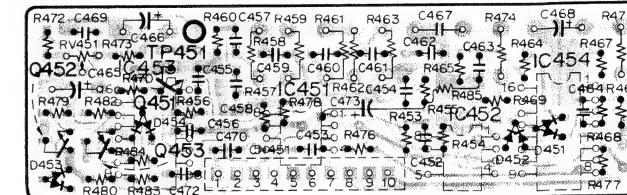


**VA-16** -SOLDERING SIDE-  
1-608-575-15,16  
BVV-1A

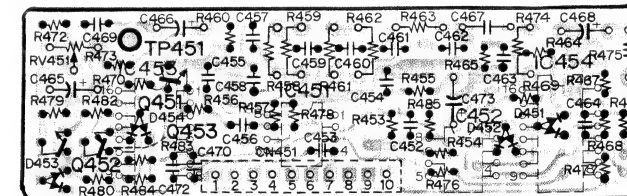
CN201	D - 3	LV501	D - 2	RV1	E - 4	TP1	D - 4
CN202	B - 3	LV502	D - 1	RV2	F - 4	TP3	G - 4
CN203	C - 3	LV503	G - 1	RV3	G - 6	TP4	E - 4
CN204	B - 3	LV601	D - 1	RV4	G - 6	TP5	G - 5
CN205	E - 8	LV602	D - 2	RV5	G - 6	TP6	G - 5
CN206	B - 8	LV603	G - 1	RV6	G - 6	TP7	G - 7
CN207	A - 2			RV12	G - 4	TP8	F - 8
CN209	A - 3	Q2	E - 4	RV101	A - 4	TP9	G - 4
CN210	G - 3	Q3	C - 4	RV102	A - 4	TP10	G - 5
CN211	G - 3	Q5	F - 4	RV103	A - 4	TP11	G - 6
		Q6	F - 4	RV104	A - 4	TP12	G - 6
CP801	G - 3	Q7	G - 5	RV105	A - 4	TP13	G - 6
		Q9	E - 4	RV106	A - 6	TP14	G - 6
D1	C - 4	Q11	G - 6	RV107	A - 4	TP15	G - 7
D101	A - 6	Q12	G - 7	RV108	A - 6	TP101	B - 4
D104	C - 6	Q13	G - 8	RV109	D - 6	TP102	B - 4
D106	D - 7	Q14	F - 8	RV110	C - 4	TP106	D - 5
D107	D - 6	Q15	G - 4	RV111	D - 5	TP107	C - 4
D302	E - 5	Q16	G - 6	RV112	D - 6	TP108	E - 6
D701	B - 2	Q101	B - 6	RV113	D - 6	TP109	C - 5
D801	G - 2	Q102	B - 7	RV301	E - 6	TP110	B - 5
D802	G - 2	Q103	B - 6	RV303	E - 6	TP111	C - 6
D901	B - 4	Q104	B - 7	RV304	D - 4	TP112	C - 6
		Q105	C - 6	RV401	G - 7	TP113	C - 6
E1	G - 4	Q106	C - 7	RV402	E - 7	TP114	B - 6
E2	G - 4	Q107	C - 7	RV403	G - 7	TP115	B - 6
E102	C - 7	Q108	C - 7	RV404	E - 7	TP116	C - 5
E103	E - 6	Q109	D - 7	RV405	D - 7	TP117	C - 4
E301	D - 4	Q111	C - 5	RV406	B - 7	TP301	D - 5
E401	E - 7	Q112	C - 4	RV407	D - 7	TP302	F - 4
E402	A - 7	Q113	C - 4	RV408	A - 7	TP303	E - 6
E403	E - 7	Q114	C - 4	RV409	F - 8	TP304	E - 7
E404	A - 7	Q115	C - 5	RV410	F - 7	TP305	B - 8
E801	G - 3	Q116	C - 4	RV411	C - 8	TP306	D - 4
E802	E - 2	Q117	D - 5	RV412	C - 7	TP307	E - 5
E803	B - 1	Q118	A - 4	RV451	F - 5	TP308	E - 5
		Q119	A - 4	RV501	E - 3	TP401	G - 7
FL1	B - 4	Q120	C - 6	RV502	E - 2	TP402	E - 8
FL2	A - 4	Q121	D - 6	RV503	G - 3	TP403	E - 8
FL3	C - 4	Q122	D - 7	RV601	E - 2	TP404	D - 7
		Q123	B - 4	RV602	E - 2	TP405	B - 8
IC1	G - 4	Q124	B - 6	RV603	G - 2	TP406	B - 8
IC3	G - 3	Q125	A - 5	RV701	C - 3	TP451	F - 4
IC4	F - 8	Q126	A - 6	RV702	F - 3	TP452	F - 5
IC101	B - 5	Q301	D - 4	RV703	A - 3	TP453	F - 6
IC102	B - 6	Q302	C - 5	RV801	G - 2	TP454	G - 4
IC103	A - 5	Q303	F - 5			TP501	G - 1
IC104	A - 6	Q304	D - 8	S1	C - 1	TP502	G - 3
IC105	C - 7	Q305	D - 8			TP503	B - 3
IC106	C - 5	Q306	E - 6			TP504	C - 2
IC107	D - 5	Q501	E - 3			TP505	C - 2
IC108	D - 6	Q601	E - 2			TP506	F - 3
IC301	D - 4	Q701	B - 1			TP601	G - 2
IC303	F - 6	Q702	B - 1			TP602	G - 3
IC304	B - 8	Q703	B - 2			TP603	D - 2
IC501	C - 3	Q704	B - 2			TP604	D - 2
IC502	E - 1	Q801	G - 2			TP605	D - 2
IC503	E - 2					TP606	F - 2
IC601	D - 3					TP701	D - 3
IC602	D - 1					TP702	A - 3



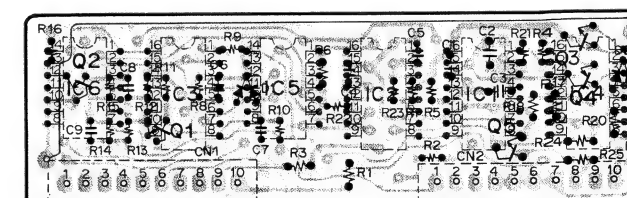
**RA-8**-SOLDERING SIDE-  
1-608-026-11,12  
BVV-1A  
BVV-1APS



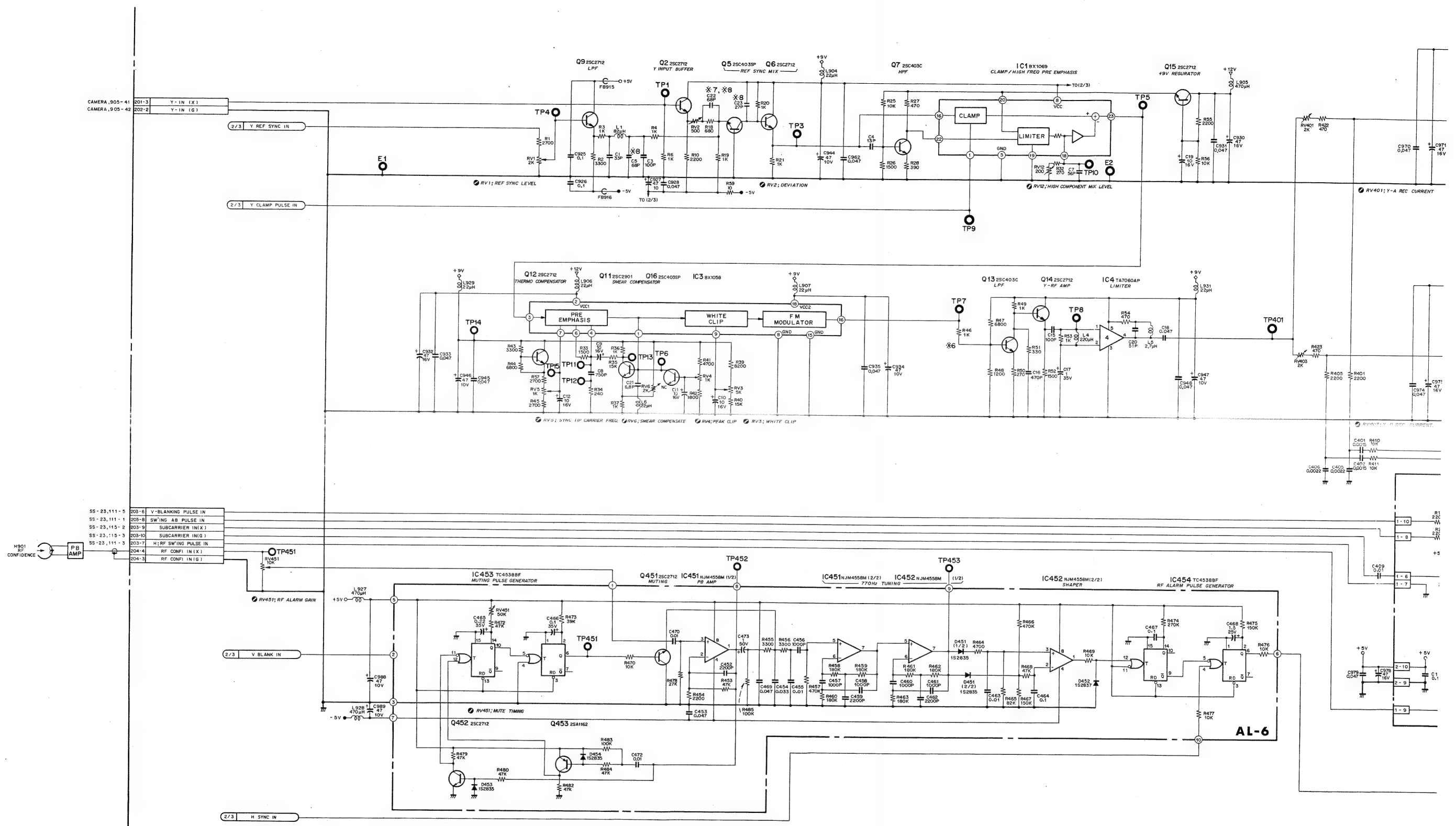
**AL-6**-SOLDERING SIDE-  
1-608-694-13  
BVV-1A  
BVV-1APS

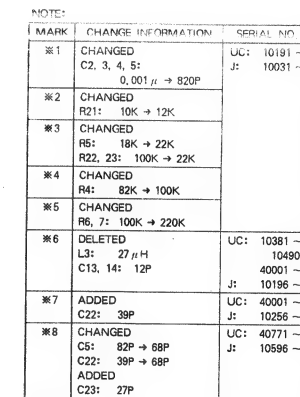


**AL-6** — SOLDERING SIDE—  
1 - 608-694-14  
BVV-1A  
BVV-1APS



**TG-5 - SOLDERING SIDE -**  
1 - 608-027-16  
BVV-1A  
BVV-1APS



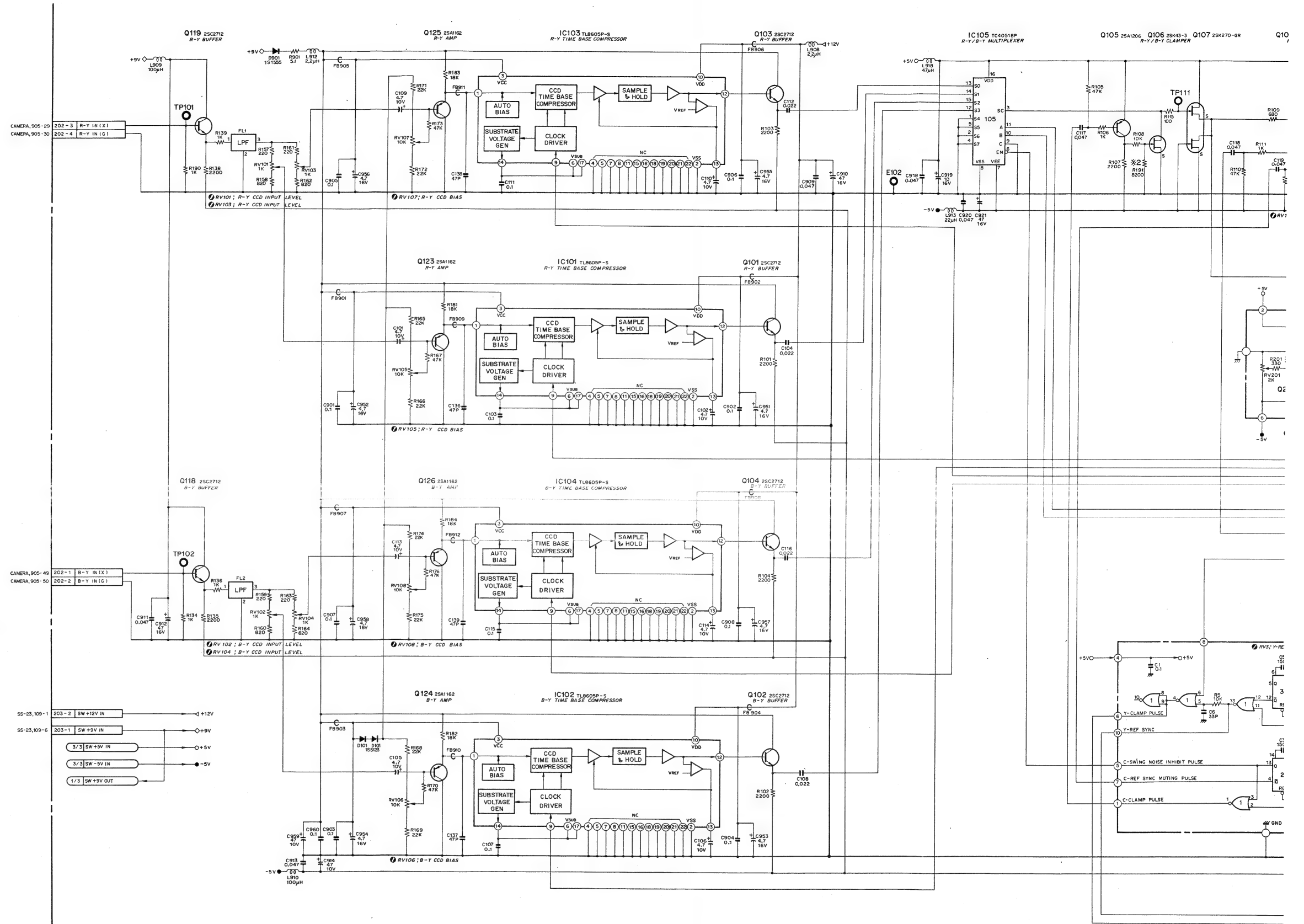


VIDEO LUMINANCE BLOCK  
1-608-575-1516  
BVV-1A

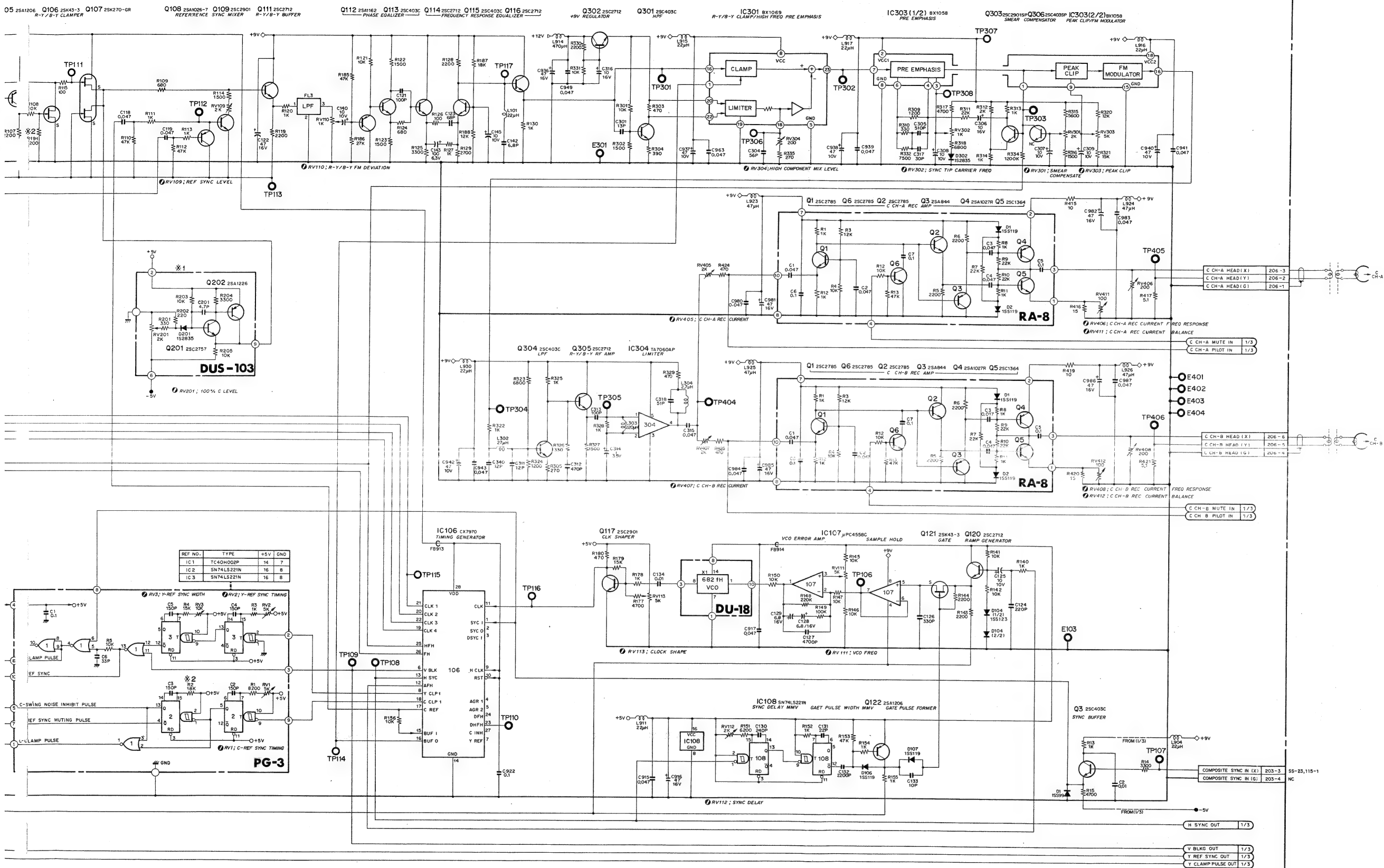
VA-16 (2/3) (VIDEO CHROMINANCE SYSTEM)

NOTE:

MARK	CHANGE INFORMATION	SERIAL NO.
※1	DUS-103 ADDED	UC: 40771 ~ J: 10596 ~
※2	R2 8200 → 18K R191 8200 ADDED	UC: 41561 ~ J: 10671 ~





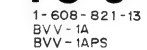
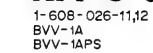


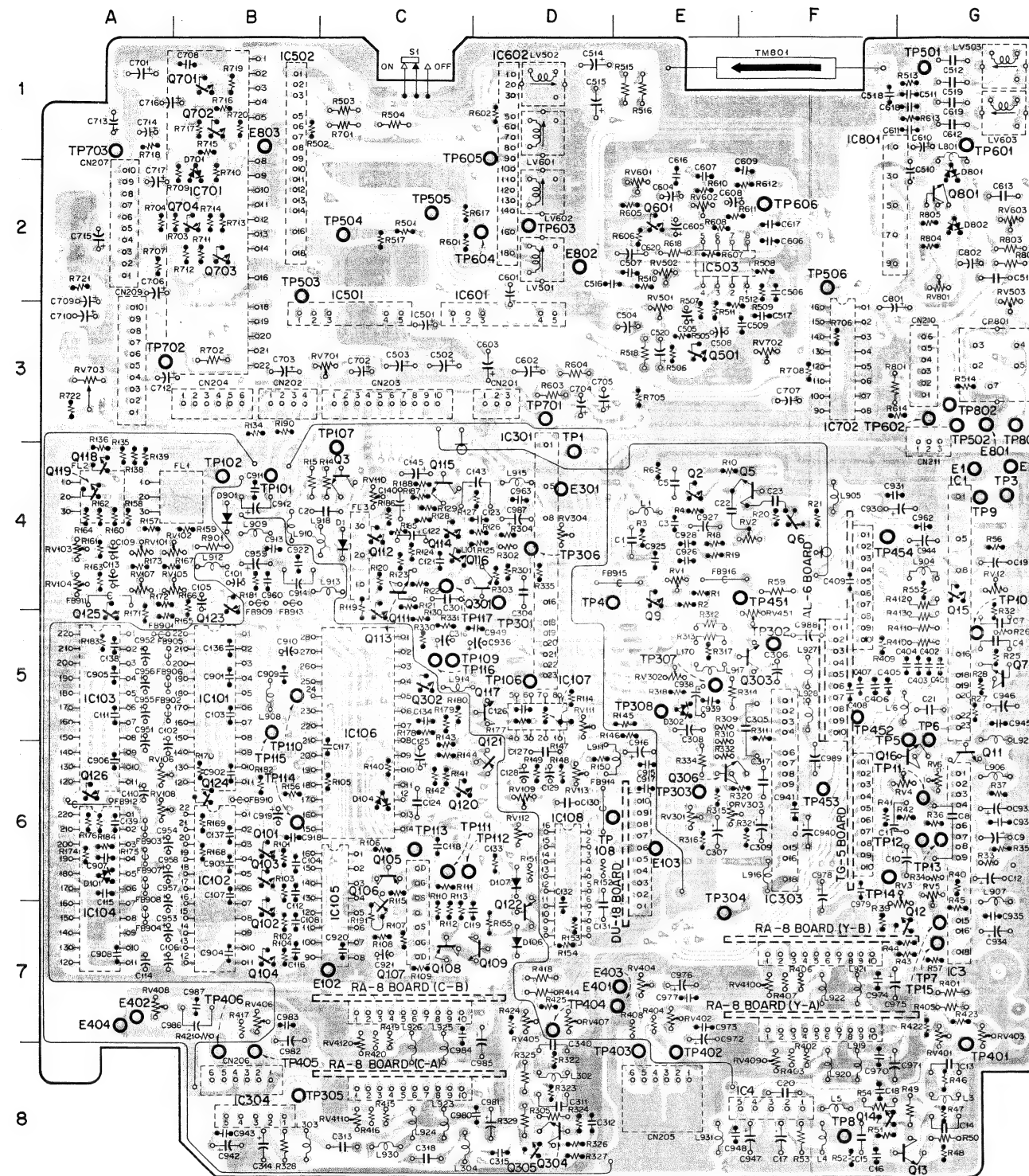


## DUS-103



IC201	D - 3	LV501	D - 2	RV1	E - 4	TP1	D - 4
IC202	B - 3	LV502	D - 1	RV2	F - 4	TP3	G - 4
IC203	C - 3	LV503	G - 1	RV3	G - 6	TP4	E - 4
IC204	B - 3	LV601	D - 1	RV4	G - 6	TP5	G - 5
IC205	E - 8	LV602	D - 2	RV5	G - 6	TP6	G - 5
IC206	B - 8	LV603	G - 1	RV6	G - 6	TP7	G - 7
IC207	A - 2			RV12	G - 4	TP8	F - 8
IC209	A - 3	Q2	E - 4	RV101	A - 4	TP9	G - 4
IC210	G - 3	Q3	C - 4	RV102	A - 4	TP10	G - 5
IC211	G - 3	Q5	F - 4	RV103	A - 4	TP11	G - 6
		Q6	F - 4	RV104	A - 4	TP12	G - 6
		Q7	G - 5	RV105	A - 4	TP13	G - 6
CP801	G - 3	Q9	E - 4	RV106	A - 6	TP14	G - 6
				RV107	A - 4	TP15	G - 4
D1	C - 4	Q11	G - 6	RV108	A - 6	TP101	B - 7
D101	A - 6	Q12	G - 7	RV109	D - 6	TP102	B - 4
D104	C - 6	Q13	G - 8	RV110	C - 4	TP106	D - 5
D106	D - 7	Q14	F - 8	RV111	D - 5	TP107	C - 4
D107	D - 6	Q15	G - 4	RV112	D - 6	TP108	E - 6
D302	E - 5	Q16	G - 6	RV113	D - 6	TP109	C - 5
D701	B - 2	Q101	B - 6	RV301	E - 6	TP110	B - 5
D801	G - 2	Q102	B - 7	RV303	E - 6	TP111	C - 6
D802	G - 2	Q103	B - 6	RV304	D - 4	TP112	C - 6
D901	B - 4	Q104	B - 7	RV401	G - 7	TP113	C - 6
		Q105	C - 6	RV402	E - 7	TP114	B - 6
E1	G - 4	Q106	C - 7	RV403	G - 7	TP115	B - 5
E2	G - 4	Q107	C - 7	RV404	E - 7	TP116	C - 5
E102	C - 7	Q108	C - 7	RV405	D - 7	TP117	C - 4
E103	E - 6	Q109	D - 7	RV406	B - 7	TP301	D - 5
E301	D - 4	Q111	C - 5	RV407	D - 7	TP302	F - 4
E401	E - 7	Q112	C - 4	RV408	A - 7	TP303	E - 6
E402	A - 7	Q113	C - 4	RV409	F - 8	TP304	E - 7
E403	E - 7	Q114	C - 4	RV410	F - 7	TP305	B - 8
E404	A - 7	Q115	C - 4	RV411	C - 8	TP306	D - 4
E801	G - 3	Q116	C - 4	RV412	C - 7	TP307	G - 4
E802	D - 2	Q117	D - 5	RV451	F - 5	TP308	E - 5
E803	B - 1	Q118	A - 4	RV501	E - 3	TP401	G - 7
		Q119	A - 4	RV502	E - 2	TP402	E - 8
FL1	B - 4	Q120	C - 6	RV503	G - 3	TP403	E - 8
FL2	A - 4	Q121	D - 6	RV601	E - 2	TP404	D - 7
FL3	C - 4	Q122	D - 7	RV602	E - 2	TP405	B - 8
		Q123	B - 4	RV603	G - 2	TP406	B - 8
IC1	G - 4	Q124	B - 6	RV701	C - 3	TP451	F - 4
IC3	G - 6	Q125	A - 5	RV702	F - 3	TP452	F - 6
IC4	F - 8	Q126	A - 6	RV703	A - 3	TP453	F - 6
IC101	B - 6	Q301	D - 4	RV801	G - 2	TP454	G - 4
IC102	B - 6	Q302	C - 5			TP501	G - 1
IC103	A - 5	Q303	F - 5			TP502	G - 3
IC104	A - 6	Q304	D - 8			TP503	B - 3
IC105	C - 7	Q305	D - 8	S1	C - 1	TP504	C - 2
IC106	C - 5	Q306	E - 6			TP505	C - 2
IC107	D - 5	Q501	E - 3			TP506	F - 3
IC108	D - 6	Q601	E - 2			TP601	G - 2
IC301	D - 4	Q701	B - 1			TP602	G - 3
IC303	F - 6	Q702	B - 1			TP603	D - 2
IC304	B - 8	Q703	B - 2			TP604	D - 2
IC501	C - 3	Q704	B - 2			TP605	D - 2
IC502	B - 1	Q801	G - 2			TP606	F - 2
IC503	E - 2					TP701	D - 3
IC601	D - 3					TP702	A - 3
IC602	D - 1					TP703	A - 1
IC701	B - 2					TP801	G - 3
IC702	F - 3					TP802	G - 3
IC801	F - 2						

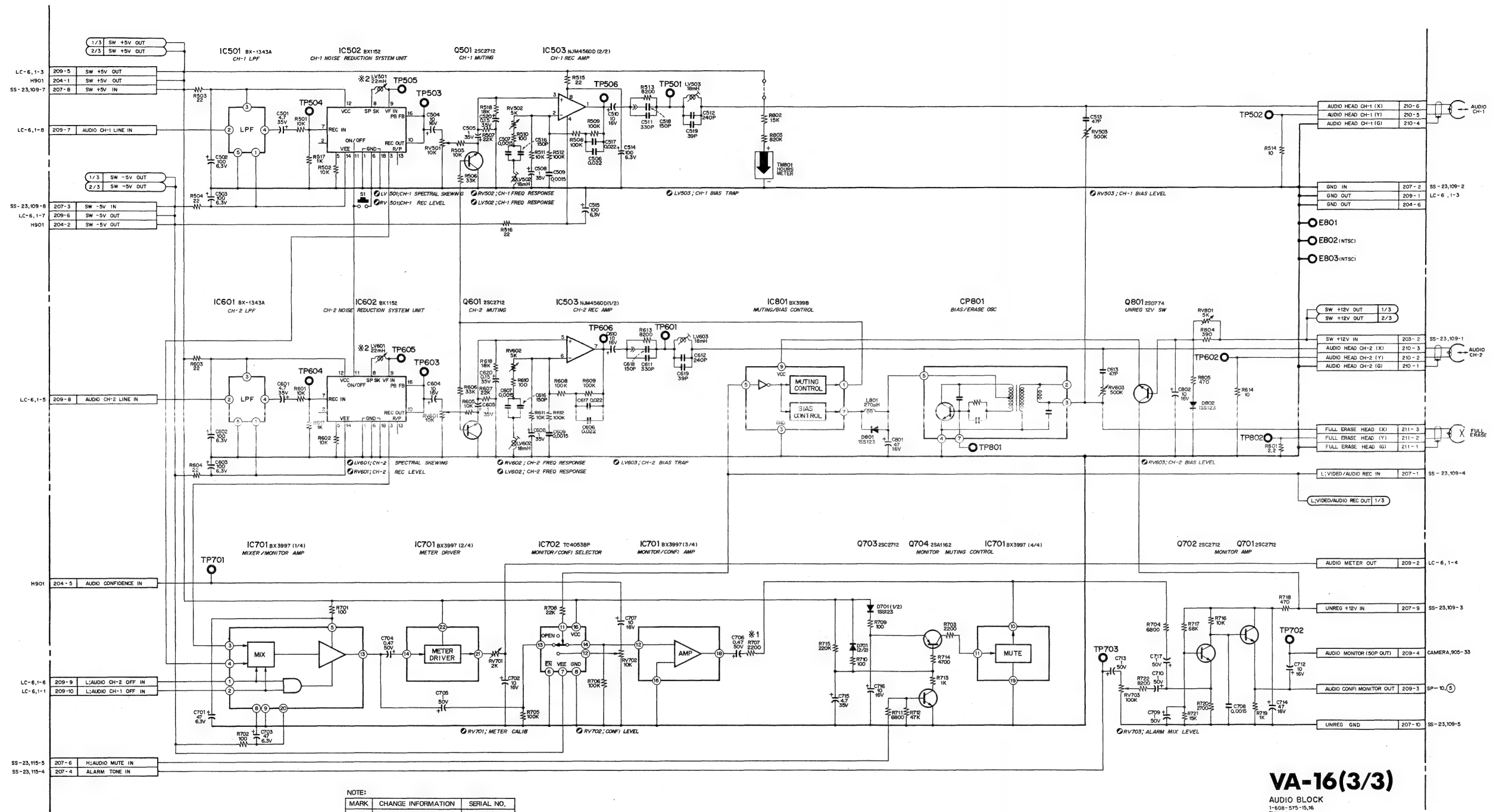




VA-16—SOLDERING SIDE—  
1-608-575-15,16  
BIV-1A

CN201 D-3	LV501 D-2	RV1 E-4	TP1 D-4
CN202 B-3	LV502 D-1	RV2 F-4	TP3 G-4
CN203 C-3	LV503 G-1	RV3 G-6	TP4 E-4
CN204 B-3	LV601 D-1	RV4 G-6	TP5 G-5
CN205 E-8	LV602 D-2	RV5 G-6	TP6 G-5
CN206 B-8	LV603 G-1	RV6 G-6	TP7 G-7
CN207 A-2		RV7 G-6	TP8 F-8
CN209 A-3		RV8 G-6	TP9 G-4
CN210 G-3		RV9 G-6	TP10 G-5
CN211 G-3		RV10 G-6	TP11 G-6
		RV11 G-6	TP12 G-6
		RV12 G-6	TP13 G-6
		RV13 G-6	TP14 G-6
		RV14 G-6	TP15 G-7
		RV15 G-6	TP16 G-5
		RV16 G-6	TP17 G-7
		RV17 G-6	TP18 G-7
		RV18 G-6	TP19 G-4
		RV19 G-6	TP20 G-5
		RV20 G-6	TP21 G-6
		RV21 G-6	TP22 G-6
		RV22 G-6	TP23 G-6
		RV23 G-6	TP24 G-6
		RV24 G-6	TP25 G-7
		RV25 G-6	TP26 G-5
		RV26 G-6	TP27 G-7
		RV27 G-6	TP28 F-8
		RV28 G-6	TP29 G-4
		RV29 G-6	TP30 G-5
		RV30 G-6	TP31 G-6
		RV31 G-6	TP32 G-6
		RV32 G-6	TP33 G-6
		RV33 G-6	TP34 G-6
		RV34 G-6	TP35 G-7
		RV35 G-6	TP36 G-5
		RV36 G-6	TP37 G-7
		RV37 G-6	TP38 F-8
		RV38 G-6	TP39 G-4
		RV39 G-6	TP40 G-5
		RV40 G-6	TP41 G-6
		RV41 G-6	TP42 G-6
		RV42 G-6	TP43 G-6
		RV43 G-6	TP44 G-6
		RV44 G-6	TP45 G-7
		RV45 G-6	TP46 G-5
		RV46 G-6	TP47 G-7
		RV47 G-6	TP48 F-8
		RV48 G-6	TP49 G-4
		RV49 G-6	TP50 G-5
		RV50 G-6	TP51 G-6
		RV51 G-6	TP52 G-6
		RV52 G-6	TP53 G-6
		RV53 G-6	TP54 G-6
		RV54 G-6	TP55 G-7
		RV55 G-6	TP56 G-5
		RV56 G-6	TP57 G-7
		RV57 G-6	TP58 F-8
		RV58 G-6	TP59 G-4
		RV59 G-6	TP60 G-5
		RV60 G-6	TP61 G-6
		RV61 G-6	TP62 G-6
		RV62 G-6	TP63 G-6
		RV63 G-6	TP64 G-6
		RV64 G-6	TP65 G-7
		RV65 G-6	TP66 G-5
		RV66 G-6	TP67 G-7
		RV67 G-6	TP68 F-8
		RV68 G-6	TP69 G-4
		RV69 G-6	TP70 G-5
		RV70 G-6	TP71 G-6
		RV71 G-6	TP72 G-6
		RV72 G-6	TP73 G-6
		RV73 G-6	TP74 G-6
		RV74 G-6	TP75 G-7
		RV75 G-6	TP76 G-5
		RV76 G-6	TP77 G-7
		RV77 G-6	TP78 F-8
		RV78 G-6	TP79 G-4
		RV79 G-6	TP80 G-5
		RV80 G-6	TP81 G-6
		RV81 G-6	TP82 G-6
		RV82 G-6	TP83 G-6
		RV83 G-6	TP84 G-6
		RV84 G-6	TP85 G-7
		RV85 G-6	TP86 G-5
		RV86 G-6	TP87 G-7
		RV87 G-6	TP88 F-8
		RV88 G-6	TP89 G-4
		RV89 G-6	TP90 G-5
		RV90 G-6	TP91 G-6
		RV91 G-6	TP92 G-6
		RV92 G-6	TP93 G-6
		RV93 G-6	TP94 G-6
		RV94 G-6	TP95 G-7
		RV95 G-6	TP96 G-5
		RV96 G-6	TP97 G-7
		RV97 G-6	TP98 F-8
		RV98 G-6	TP99 G-4
		RV99 G-6	TP100 G-5

VA-16 (3/3) (AUDIO RECORD SYSTEM)



NOTE:

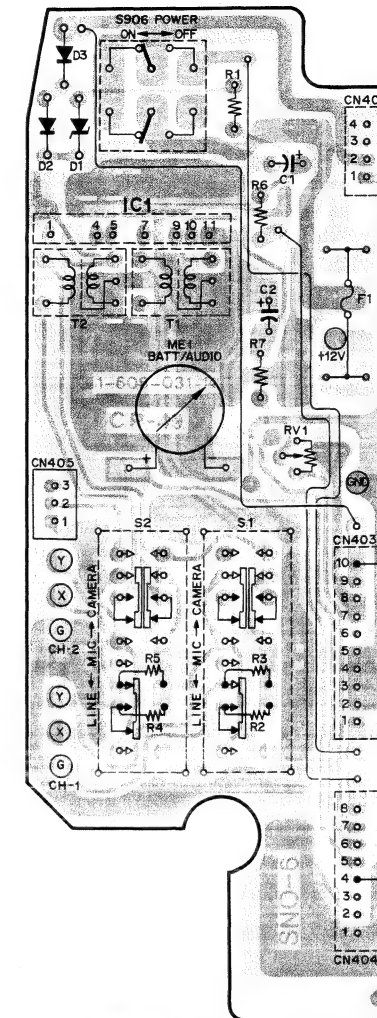
MARK	CHANGE INFORMATION	SERIAL NO.
#1	R707 2700 → 2200	UC: 40503 ~ J: 10536 ~ PS: 11026 ~
#2	LV501 20 mH → 22 mH LV601 20 mH → 22 mH	UC: 41441 ~ J: 10641 ~ PS: 11376 ~

VA-16(3/3)

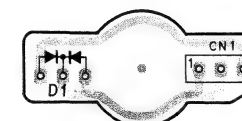
AUDIO BLOCK  
1-408: 075-10,16  
8V-1A  
8V-1A-PS

# CP-49, DUS-34

CP-49 (CONNECTOR PANEL)  
DUS-34



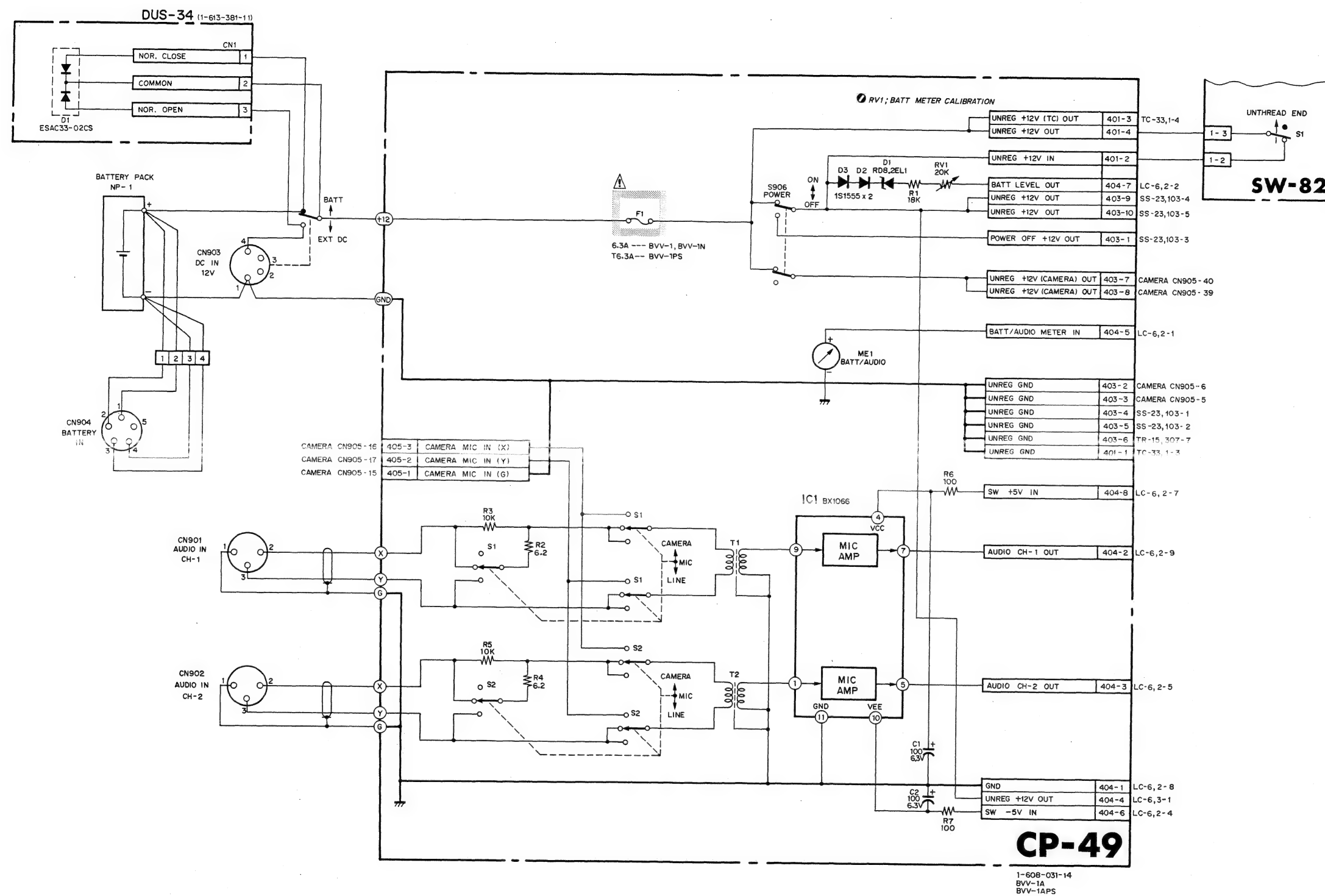
**CP-49-SOLDERING SIDE-**  
1-608-031-14  
BVV-1A  
BVV-1APS



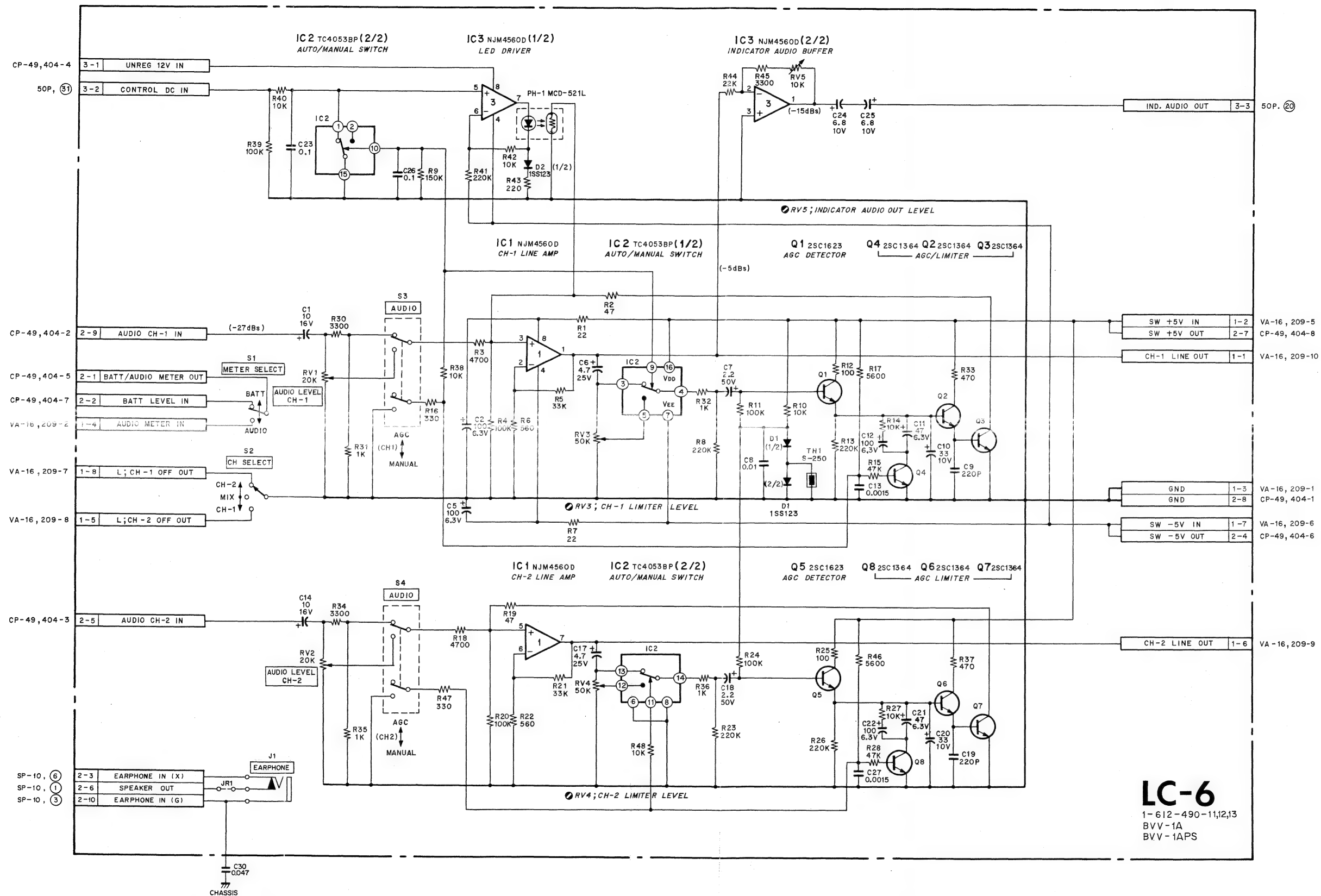
**DUS-34**  
-SOLDERING SIDE-  
1-613-381-11  
BVV-1A  
BVV-1APS



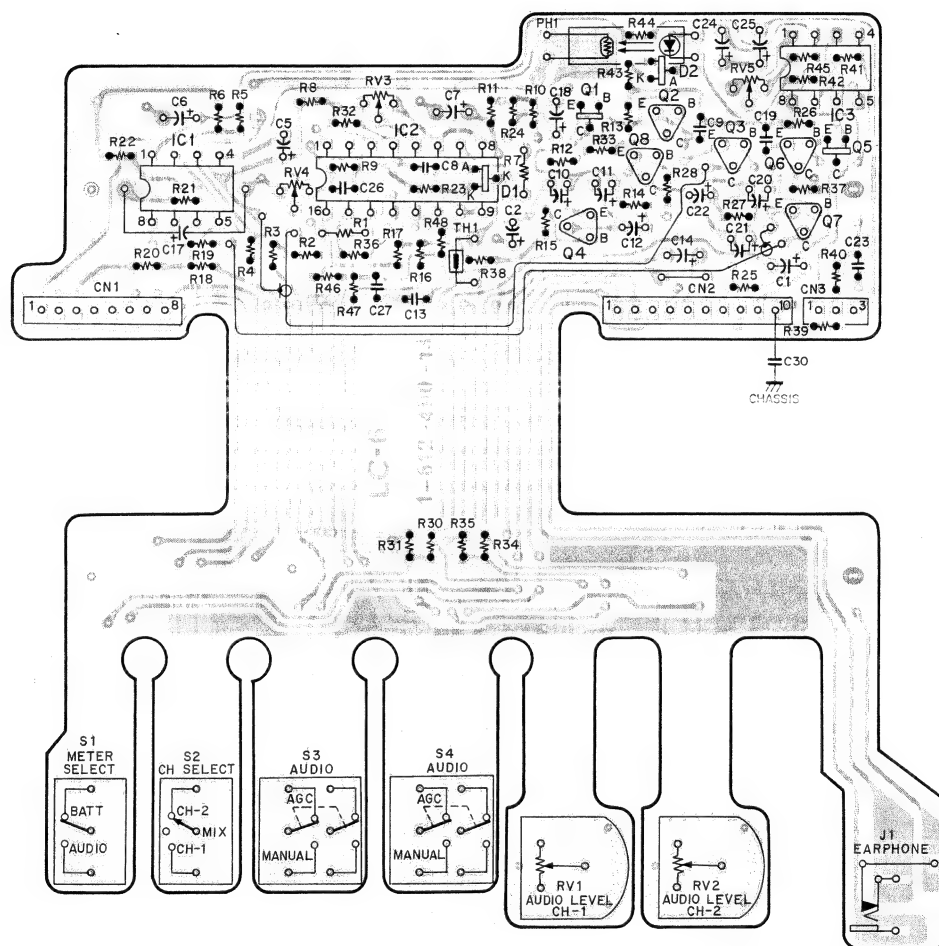
CP-49 (CONNECTOR PANEL)  
DUS-34



LC-6 (AUDIO LINE AMP/LEVEL CONTROL)



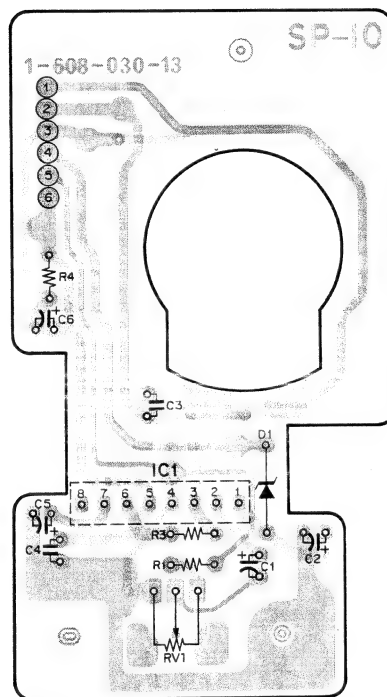
## LC-6 (AUDIO LINE AMP/LEVEL CONTROL)



**LC-6** -SOLDERING SIDE-  
 1-612-490-11,12,13  
 BVV-1A  
 BVV-1APS

# SP-10

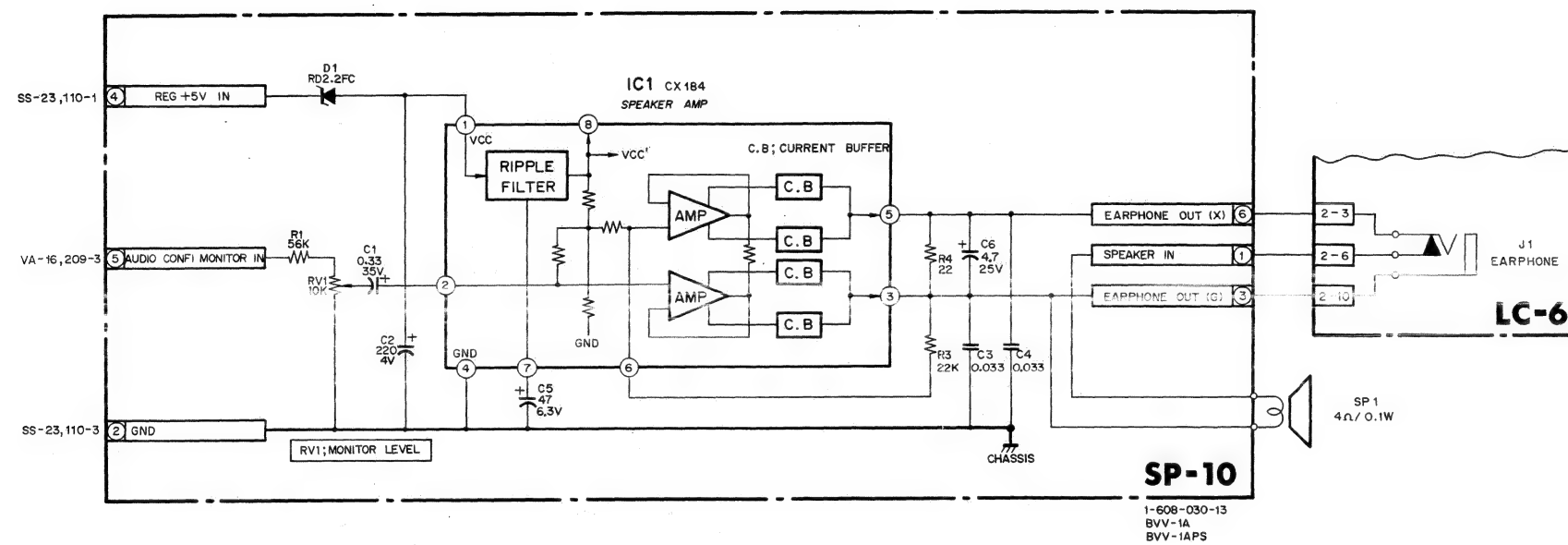
SP-10 (SPEAKER AMPLIFIER)



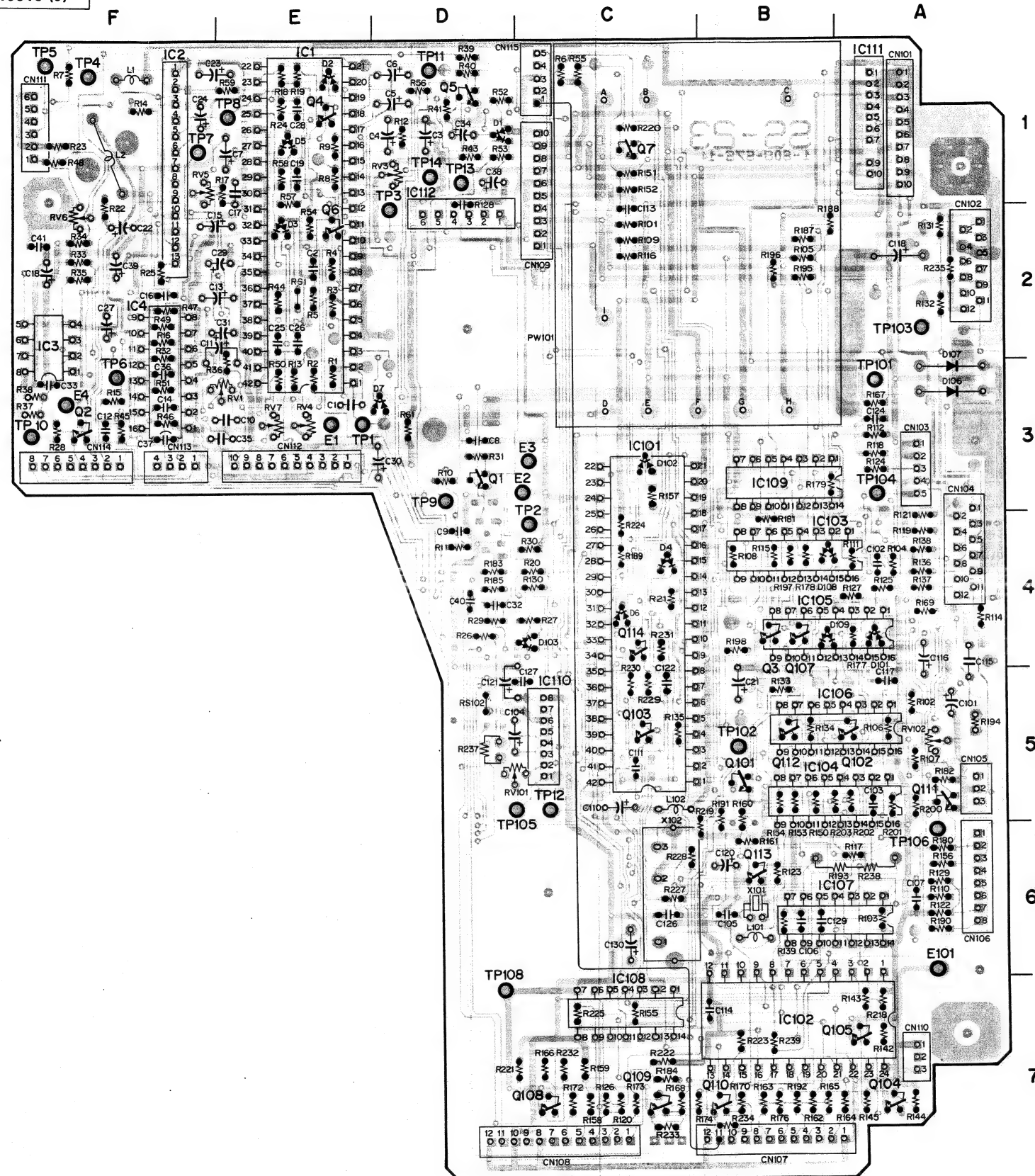
**SP-10** -SOLDERING SIDE-  
1-608-030-13  
BVV-1A  
BVV-1APS



SP-10 (SPEAKER AMPLIFIER)



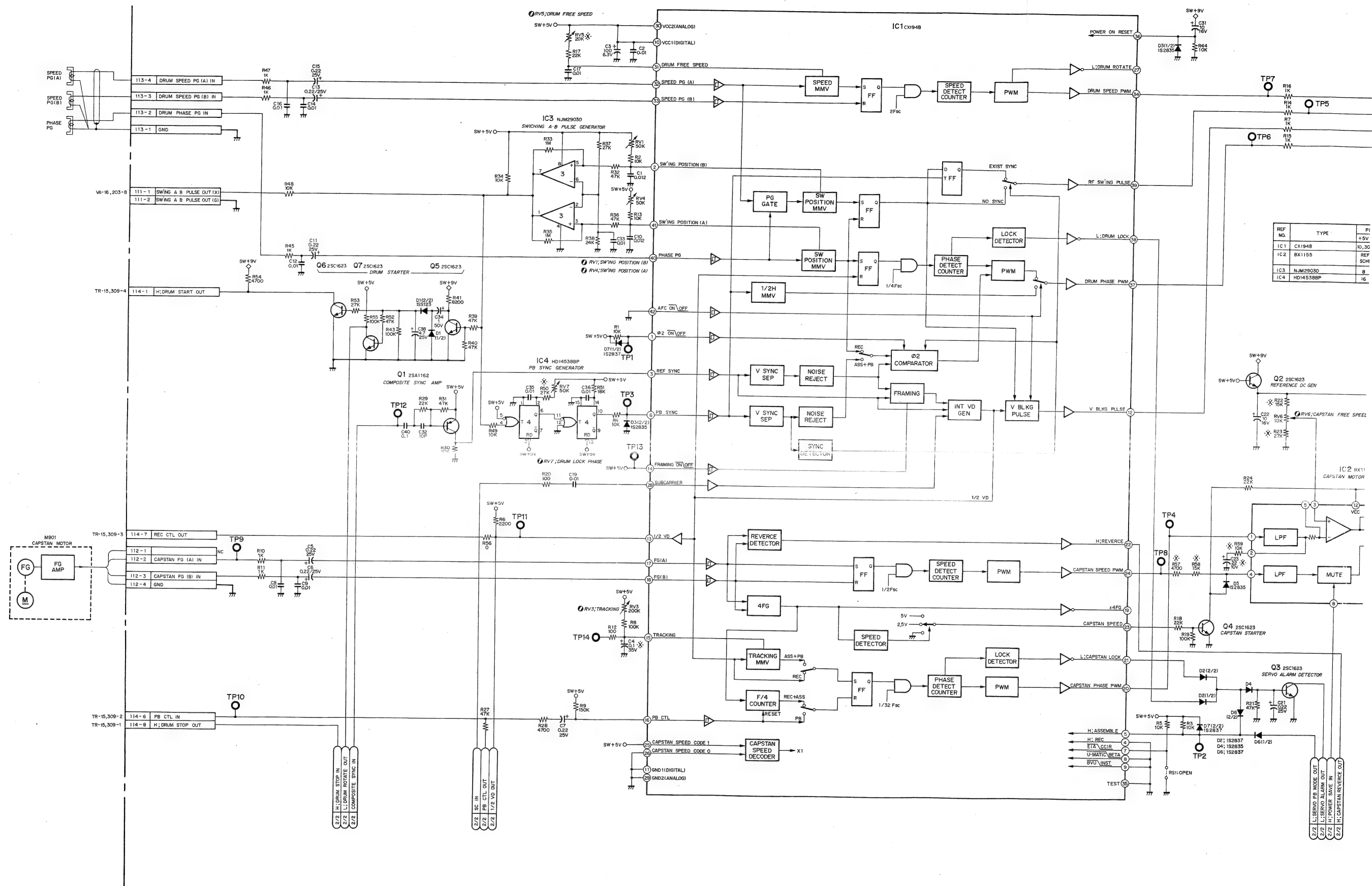
S/N 10001 to 10090 (UC)  
S/N 10001 to 10010 (J)

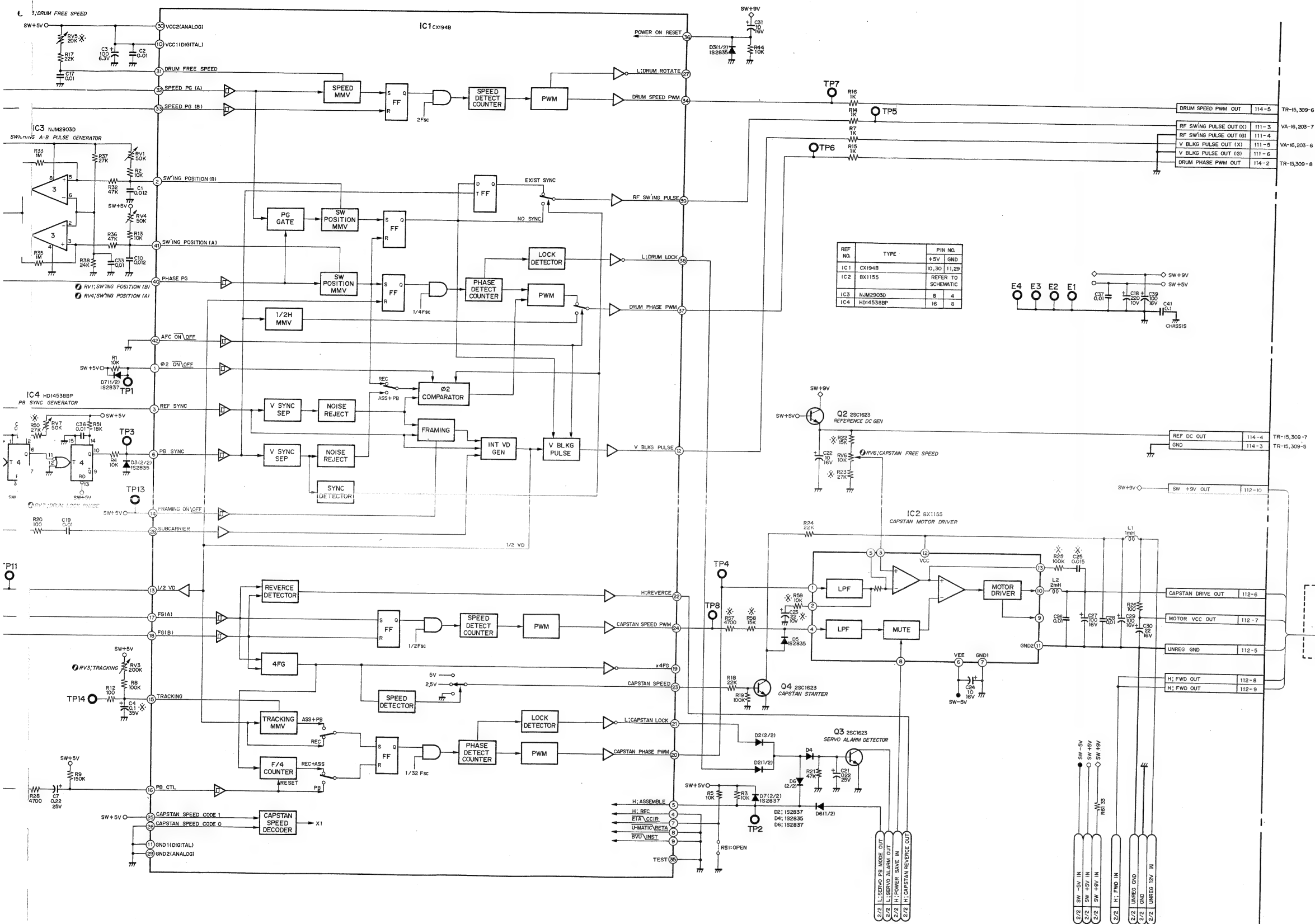


CN101	A - 1	Q1	D - 3
CN102	A - 2	Q2	F - 3
CN103	A - 3	Q3	B - 4
CN104	A - 4	Q4	E - 1
CN105	A - 5	Q5	D - 1
CN106	A - 6	Q6	E - 2
CN107	B - 7	Q7	C - 1
CN108	C - 7	Q101	B - 5
CN109	C - 1	Q102	A - 5
CN110	A - 7	Q103	C - 5
CN111	F - 1	Q104	A - 7
CN112	E - 3	Q105	A - 7
CN113	F - 3	Q107	B - 4
CN114	F - 3	Q108	C - 7
CN115	C - 1	Q109	C - 7
		Q110	B - 7
D1	D - 1	Q111	A - 5
D2	E - 1	Q112	B - 5
D3	E - 2	Q113	B - 6
D4	C - 4	Q114	C - 4
D5	E - 1		
D6	C - 4	RV1	E - 3
D7	D - 3	RV3	D - 1
D101	A - 4	RV4	E - 3
D102	C - 3	RV5	F - 1
D103	C - 4	RV6	F - 2
D106	A - 3	RV7	E - 3
D107	A - 3	RV101	D - 5
D108	B - 4	RV102	A - 5
D109	B - 4		
		TP1	E - 3
E1	E - 3	TP2	C - 4
E2	C - 3	TP3	D - 2
E3	C - 3	TP4	F - 1
E4	F - 3	TP5	F - 1
E101	A - 6	TP6	F - 3
		TP7	F - 1
IC1	E - 1	TP8	E - 1
IC2	F - 1	TP9	D - 3
IC3	F - 2	TP10	F - 3
IC4	F - 3	TP11	D - 1
IC101	C - 4	TP12	C - 5
IC102	B - 7	TP13	D - 1
IC103	B - 4	TP14	D - 1
IC104	B - 5	TP101	A - 3
IC105	B - 4	TP102	B - 5
IC106	B - 4	TP103	A - 2
IC107	B - 6	TP104	A - 3
IC108	C - 7	TP105	D - 5
IC109	B - 3	TP106	A - 6
IC110	C - 5	TP108	D - 7
IC111	A - 1		
IC112	D - 2	X101	B - 6
		X102	C - 6
PW101	B - 2		

Ref.	NTSC	PAL
C4	0.1 $\mu$	0.22 $\mu$
C23	22 $\mu$	47 $\mu$
C25	0.015 $\mu$	0.1 $\mu$
R22	15K	10K
R23	27K	47K
R25	100K	330K
R50	27K	47K
R57	4.7K	8.2K
R58	15K	SHORT
R59	10K	5.6K
R203	SHORT	OPEN
RS1	OPEN	SHORT
RV5	20K	50K
X102	3.58 MHz	4.43 MHz

**SS-23** - COMPONENT SIDE -  
1-608-576-14  
BVV-1A  
BVV-1APS





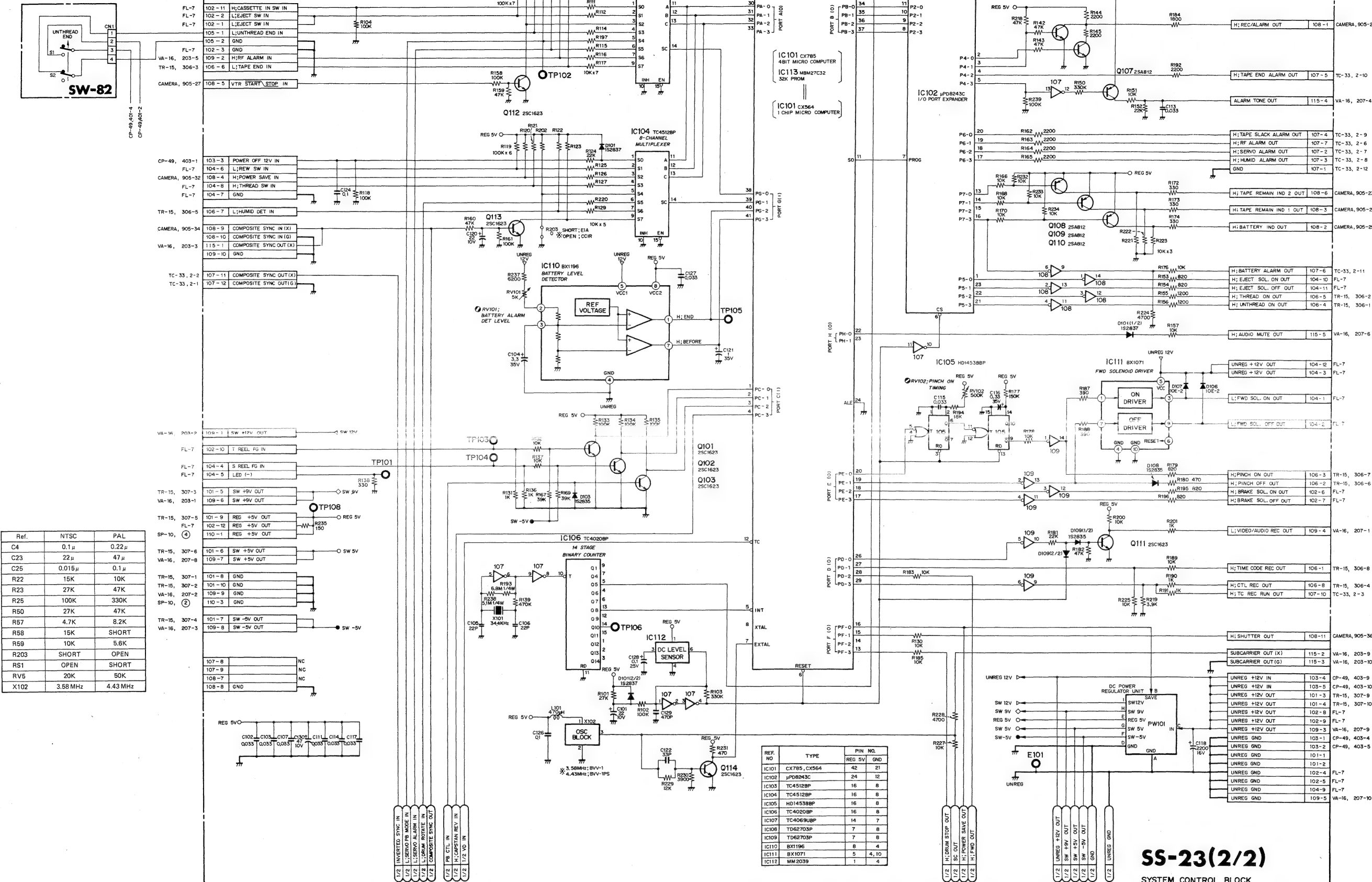
SS-23(1/2)

SERVO BLOCK  
1-608-576-13,14,15,16,17,18  
BVV-14  
BVV-12PS

SS-23 (2/2) (SYSTEM CONTROL)  
SW-82

S/N 10001 to 10090 (UC)  
S/N 10001 to 10010 (J)

FL-7



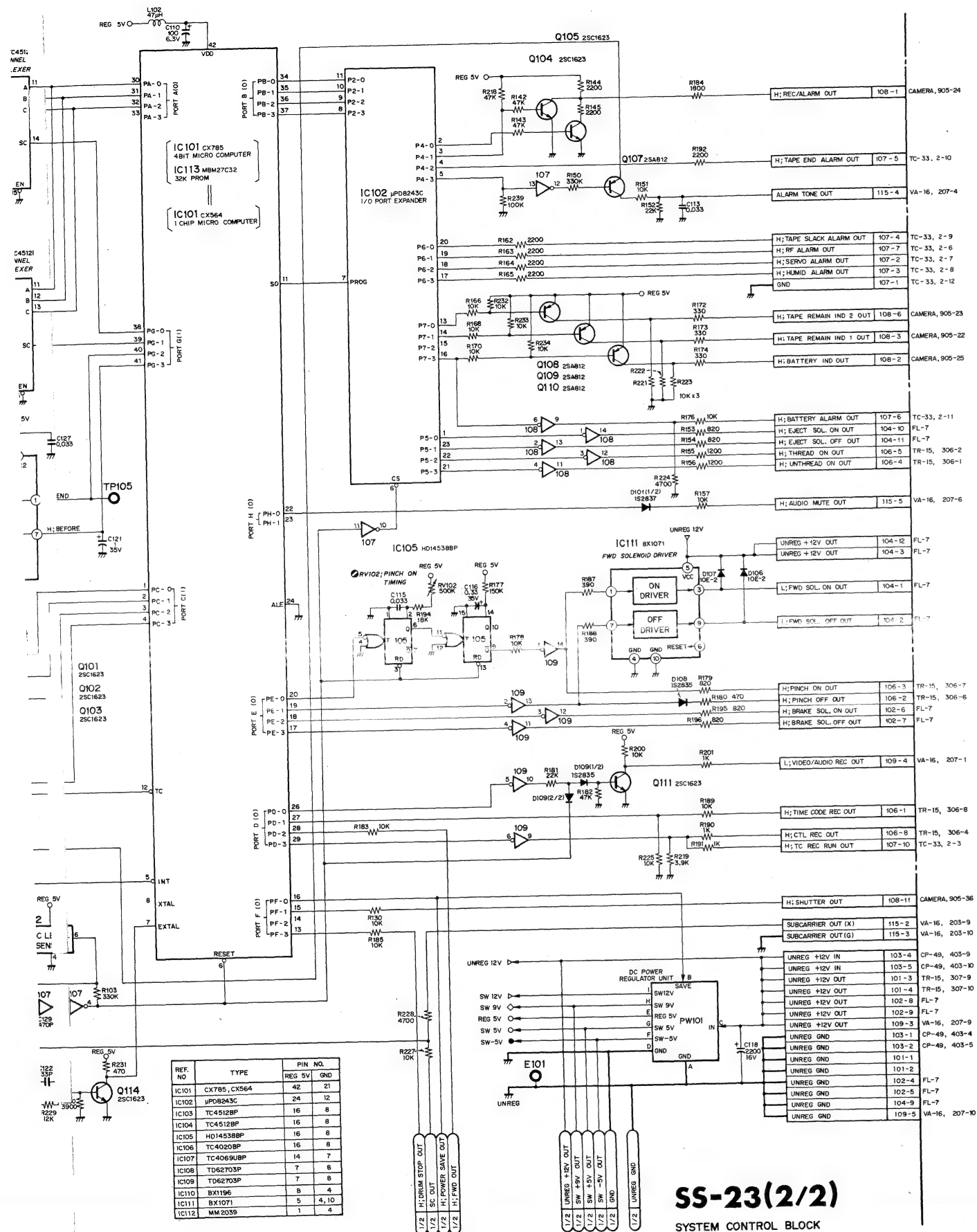
15-34 (a)

SS-23(2/2)

SYSTEM CONTROL BLOCK  
1-609-576-13, 14  
BVV-1  
BVV-1PS

15-35 (a)

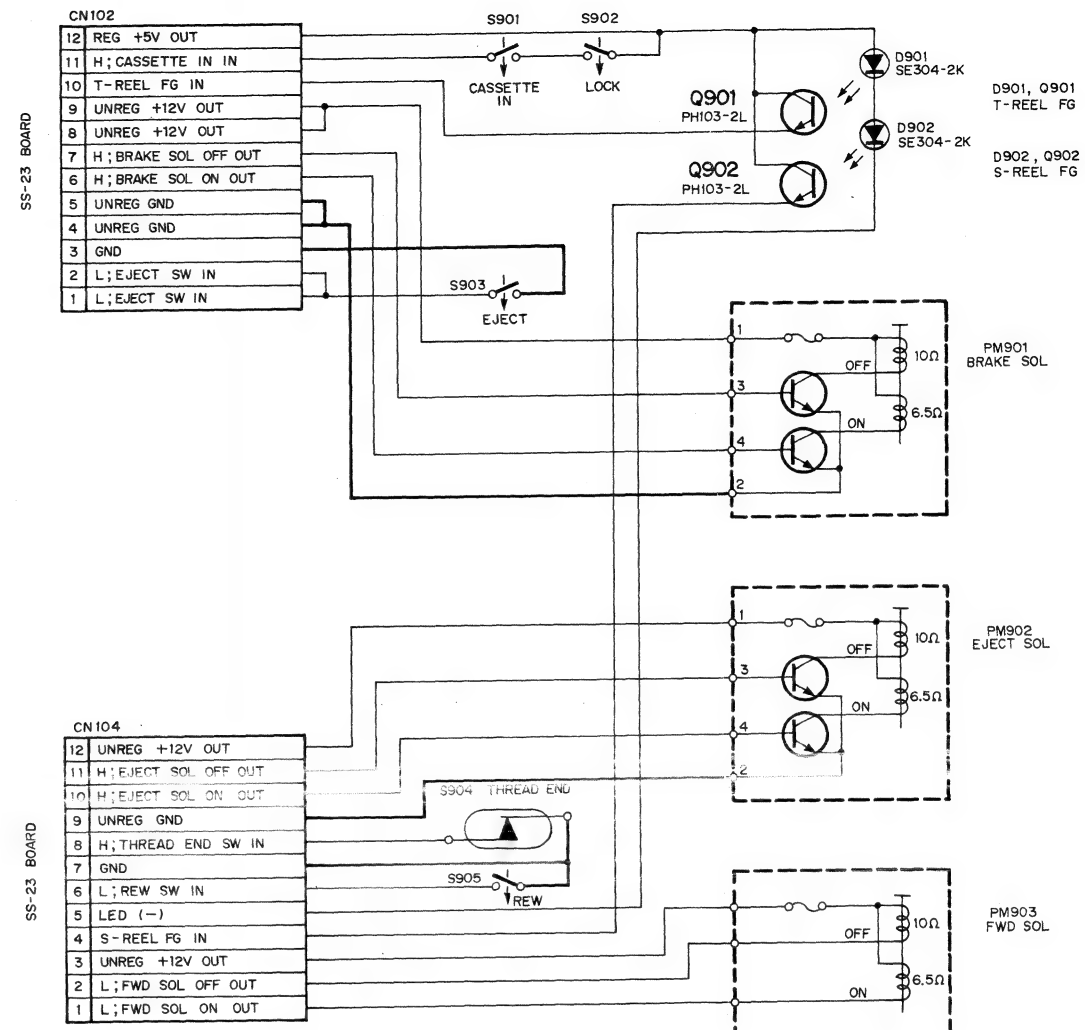
FL-7



## SS-23(2/2)

SYSTEM CONTROL BLOCK  
1-608-576-13, 14  
BVV-1  
BVV-1PS

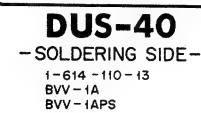
15-35 (a)



15-36 (a)



**S/N 40503 and later (UC)**  
**S/N 10536 and later (J)**

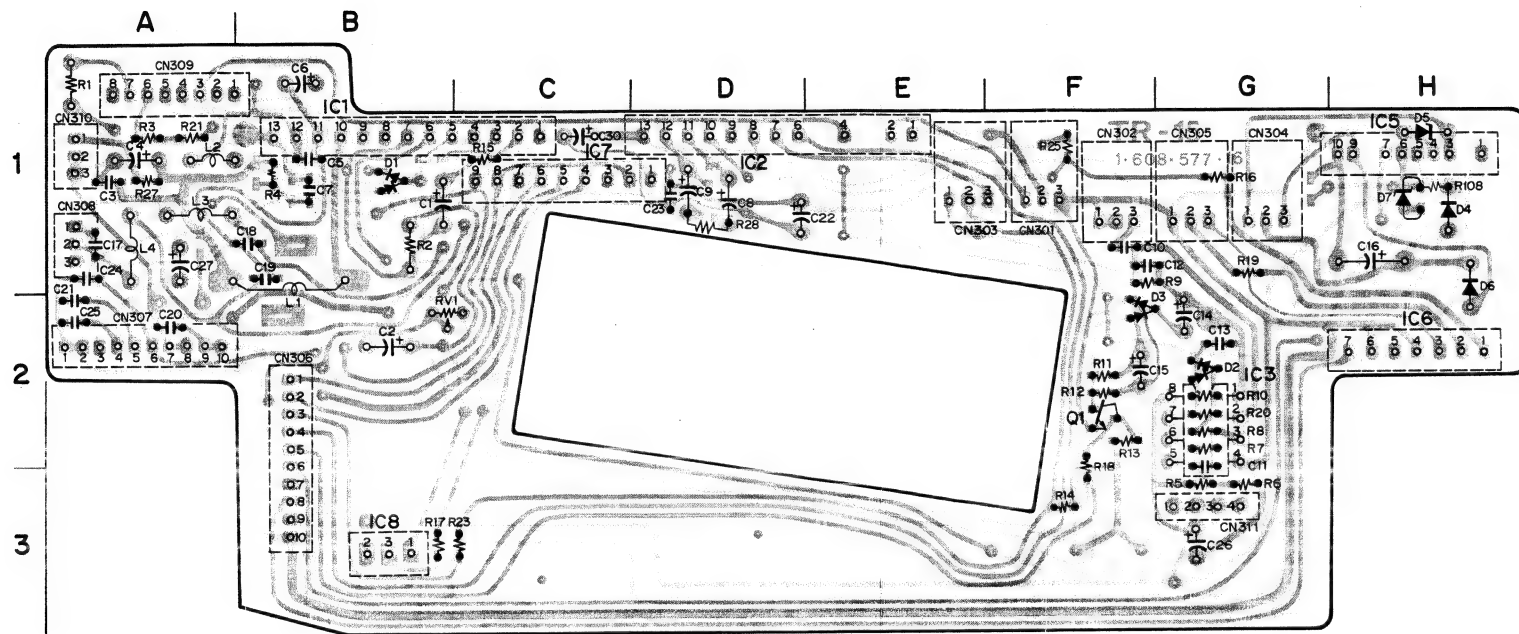


**SS-23** - COMPONENT SIDE -  
1-608-576-17,18  
BVV-1A  
BVV-1APS

Ref.	NTSC	PAL
C4	0.1 $\mu$	0.22 $\mu$
C23	22 $\mu$	47 $\mu$
C25	0.015 $\mu$	0.1 $\mu$
R22	15K	10K
R23	27K	47K
R25	100K	330K
R50	27K	47K
R57	4.7K	8.2K
R58	15K	SHORT
R59	10K	5.6K
R203	SHORT	OPEN
RS1	OPEN	SHORT
RV5	20K	50K
X102	3.58 MHz	4.43 MHz

TR-15  
DU-55

S/N 10001 to 10170 (UC)  
S/N 10001 to 10010 (J)



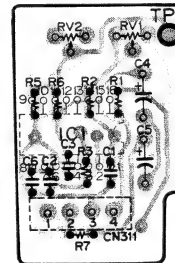
**TR-15-SOLDERING SIDE-**  
1-608-577-15,16  
BVV-1A

TR-15

Ref.	NTSC	PAL
C7	0.015 $\mu$	0.1 $\mu$
R3	5.6K	22K
R26	OPEN	220K
C35	OPEN	0.1 $\mu$

DU-55

Ref.	NTSC	PAL
C1	0.1 $\mu$	0.15 $\mu$
C2	0.022 $\mu$	0.015 $\mu$
C6	0.022 $\mu$	0.015 $\mu$
RV1	200K	500K

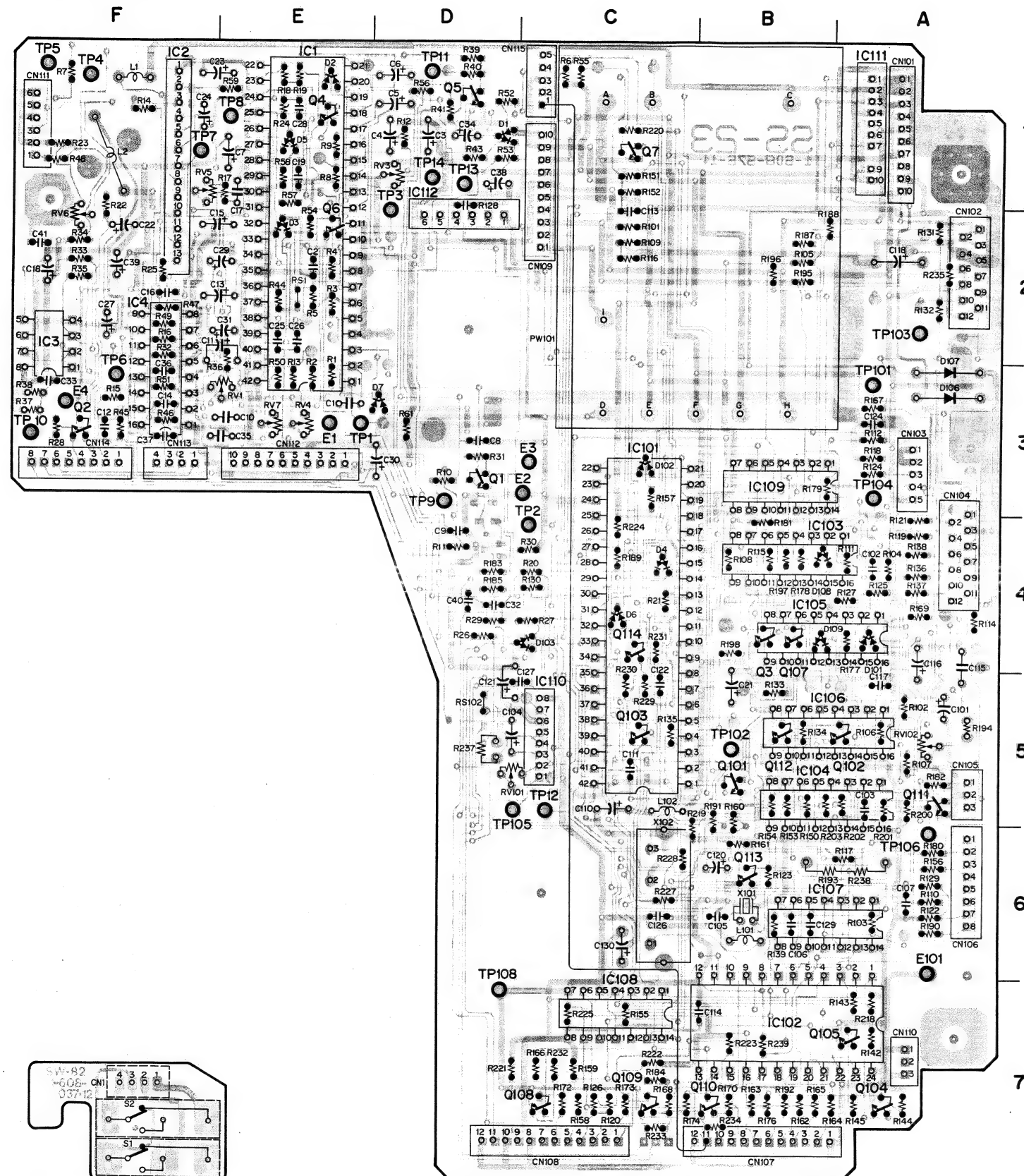


**DU-55**  
-SOLDERING SIDE-  
1-610-849-13  
BVV-1A



SS-23 (SYSTEM CONTROL)  
SW-82

S/N 10001 to 10090 (UC)  
S/N 10001 to 10010 (J)



CN101	A - 1	Q1	D - 3
CN102	A - 2	Q2	F - 3
CN103	A - 3	Q3	B - 4
CN104	A - 4	Q4	E - 1
CN105	A - 5	Q5	D - 1
CN106	A - 6	Q6	E - 2
CN107	B - 7	Q7	C - 1
CN108	C - 7	Q101	B - 5
CN109	C - 1	Q102	A - 5
CN110	A - 7	Q103	C - 5
CN111	F - 1	Q104	A - 7
CN112	E - 3	Q105	A - 7
CN113	F - 3	Q107	B - 4
CN114	F - 3	Q108	C - 7
CN115	C - 1	Q109	C - 7
		Q110	B - 7
		Q111	A - 5
		Q112	B - 5
		Q113	B - 6
		Q114	C - 4
D1	D - 1	RV1	E - 3
D2	E - 1	RV3	D - 1
D3	E - 2	RV4	E - 3
D4	C - 4	RV5	F - 1
D5	E - 1	RV6	F - 2
D6	C - 4	RV7	E - 3
D7	D - 3	RV101	D - 5
D101	A - 4	RV102	A - 5
D102	C - 3		
D103	C - 4		
D106	A - 3		
D107	A - 3		
D108	B - 4		
D109	B - 4		
E1	E - 3	TP1	E - 3
E2	C - 3	TP2	C - 4
E3	C - 3	TP3	D - 2
E4	F - 3	TP4	F - 1
E101	A - 6	TP5	F - 1
		TP6	F - 3
		TP7	F - 1
		TP8	E - 1
		TP9	D - 3
		TP10	F - 3
		TP11	D - 1
		TP12	C - 5
		TP13	D - 1
		TP14	D - 1
		TP101	A - 3
		TP102	B - 5
		TP103	A - 2
		TP104	A - 3
		TP105	D - 5
		TP106	A - 6
		TP108	D - 7
		X101	B - 6
		X102	C - 6
PW101	B - 2		

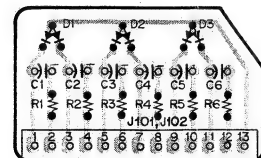
Ref.	NTSC	PAL
C4	0.1 $\mu$	0.22 $\mu$
C23	22 $\mu$	47 $\mu$
C25	0.015 $\mu$	0.1 $\mu$
R22	15K	10K
R23	27K	47K
R25	100K	330K
R50	27K	47K
R57	4.7K	8.2K
R58	15K	SHORT
R59	10K	5.6K
R203	SHORT	OPEN
RS1	OPEN	SHORT
RV5	20K	50K
X102	3.58 MHz	4.43 MHz

SW-82-SOLDERING SIDE-  
1-608-037-12  
BVV-1A  
BVV-1APS

SS-23 - COMPONENT SIDE-  
1-608-576-14  
BVV-1A  
BVV-1APS

**SS-23, DUS-40**

**S/N 10091 to 40502 (UC)**  
**S/N 10011 to 10535 (J)**

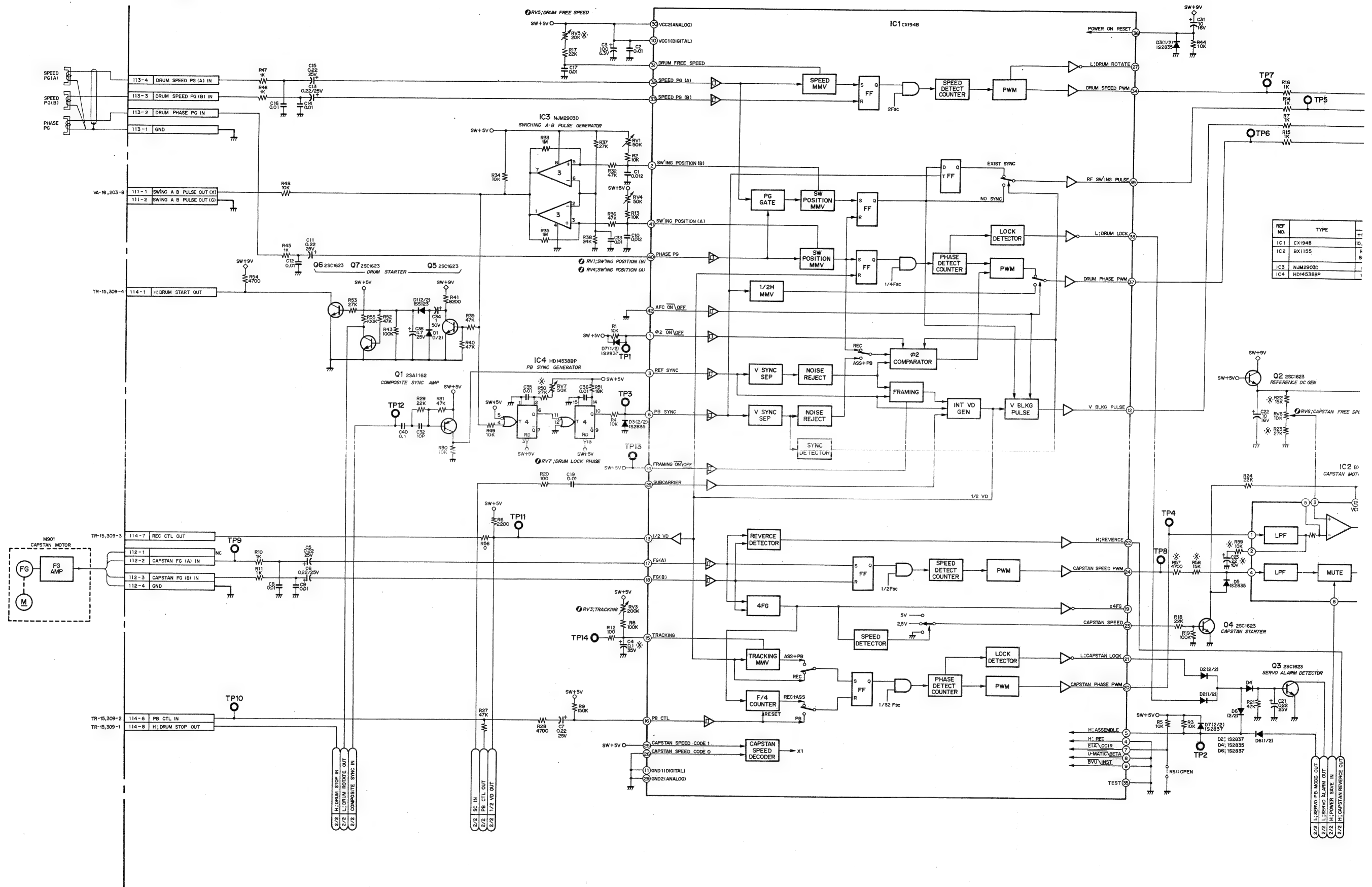


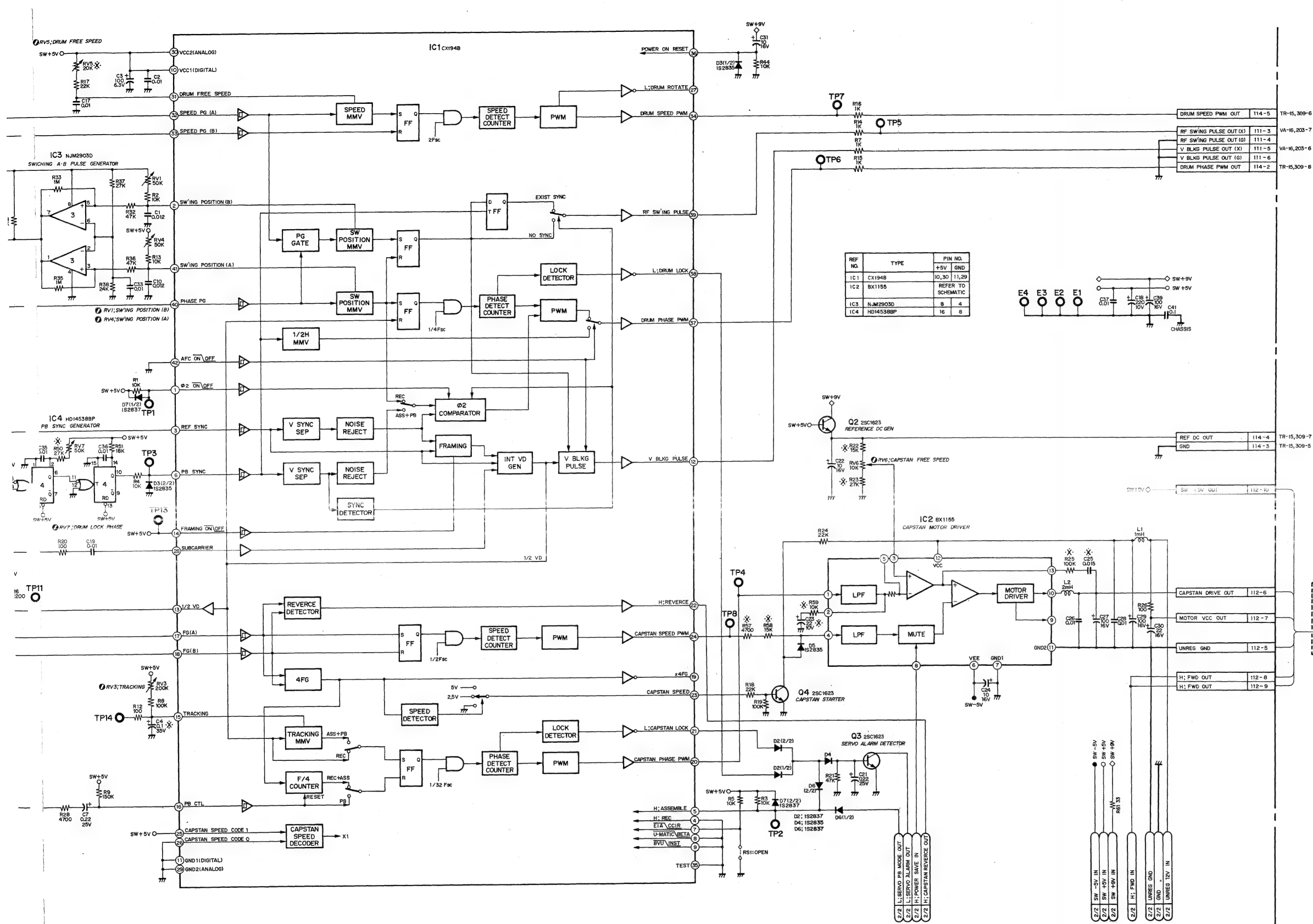
**DUS-40**  
- SOLDERING SIDE -  
1-614-110-11,12  
BVV-1A  
BVV-1APS

**SS-23** - COMPONENT SIDE -  
1-608-576-15,16  
BVV-1A  
BVV-1APS

CN101	A - 1	Q1	D - 3
CN102	A - 2	Q2	F - 3
CN103	A - 3	Q3	B - 4
CN104	A - 4	Q4	E - 1
CN105	A - 5	Q5	D - 1
CN106	A - 6	Q6	E - 2
CN107	B - 7	Q7	C - 1
CN108	C - 7	Q101	B - 5
CN109	C - 1	Q102	A - 5
CN110	A - 7	Q103	C - 5
CN111	F - 1	Q104	A - 7
CN112	E - 3	Q105	A - 7
CN113	F - 3	Q107	B - 4
CN114	F - 3	Q108	C - 7
CN115	C - 1	Q109	C - 7
		Q110	B - 7
D1	D - 1	Q111	A - 5
D2	E - 1	Q112	B - 5
D3	E - 2	Q113	B - 6
D4	C - 4	Q114	C - 4
D5	E - 1		
D6	C - 4	RV1	E - 3
D7	D - 3	RV3	D - 1
D101	A - 4	RV4	E - 3
D102	C - 3	RV5	F - 1
D103	C - 4	RV6	F - 2
D106	A - 3	RV7	E - 3
D107	A - 3	RV101	D - 5
D108	B - 4	RV102	A - 5
D109	B - 4		
D110	A - 5	TP1	D - 3
		TP2	C - 4
E1	E - 3	TP3	D - 2
E2	C - 3	TP4	F - 1
E3	C - 3	TP5	F - 1
E4	F - 3	TP6	F - 3
E101	A - 6	TP7	F - 1
		TP8	E - 1
IC1	E - 1	TP9	D - 3
IC2	F - 1	TP10	F - 3
IC3	F - 2	TP11	D - 1
IC4	F - 3	TP12	C - 5
IC101	C - 4	TP13	D - 1
IC102	B - 7	TP14	D - 1
IC103	B - 4	TP101	A - 3
IC104	B - 5	TP102	B - 5
IC105	B - 4	TP103	A - 2
IC106	B - 5	TP104	A - 3
IC107	B - 6	TP105	D - 5
IC108	C - 7	TP106	A - 5
IC109	B - 3	TP108	D - 6
IC110	C - 5		
IC111	A - 1	X101	B - 6
IC112	D - 2	X102	C - 6
PW101	B - 2		

Ref.	NTSC	PAL
C4	0.1 $\mu$	0.22 $\mu$
C23	22 $\mu$	47 $\mu$
C25	0.015 $\mu$	0.1 $\mu$
R22	15K	10K
R23	27K	47K
R25	100K	330K
R50	27K	47K
R57	4.7K	8.2K
R58	15K	SHORT
R59	10K	5.6K
R203	SHORT	OPEN
RS1	OPEN	SHORT
RV5	20K	50K
X102	3.58 MHz	4.43 MHz





Ref.	NTSC	PAL
C4	0.1μ	0.22μ
C23	22μ	47μ
C25	0.015μ	0.1μ
R22	15K	10K
R23	27K	47K
R25	100K	330K
R50	27K	47K
R57	4.7K	8.2K
R58	15K	SHORT
R59	10K	5.6K
R203	SHORT	OPEN
RS1	OPEN	SHORT
RV5	20K	50K
X102	3.58 MHz	4.43 MHz

SS-23(1/2)

SERVO BLOCK  
1-608-576-13,14,15,16,17,18  
BVV-1A  
BVV-1APS

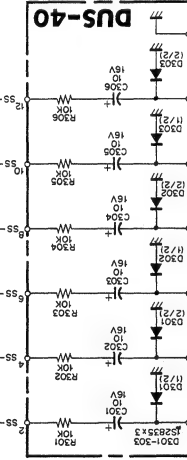
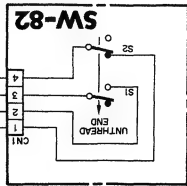


# SS-23 (2/2), SW-82, DUS-40

FL-7

## SS-23 (2/2), SW-82, DUS-40

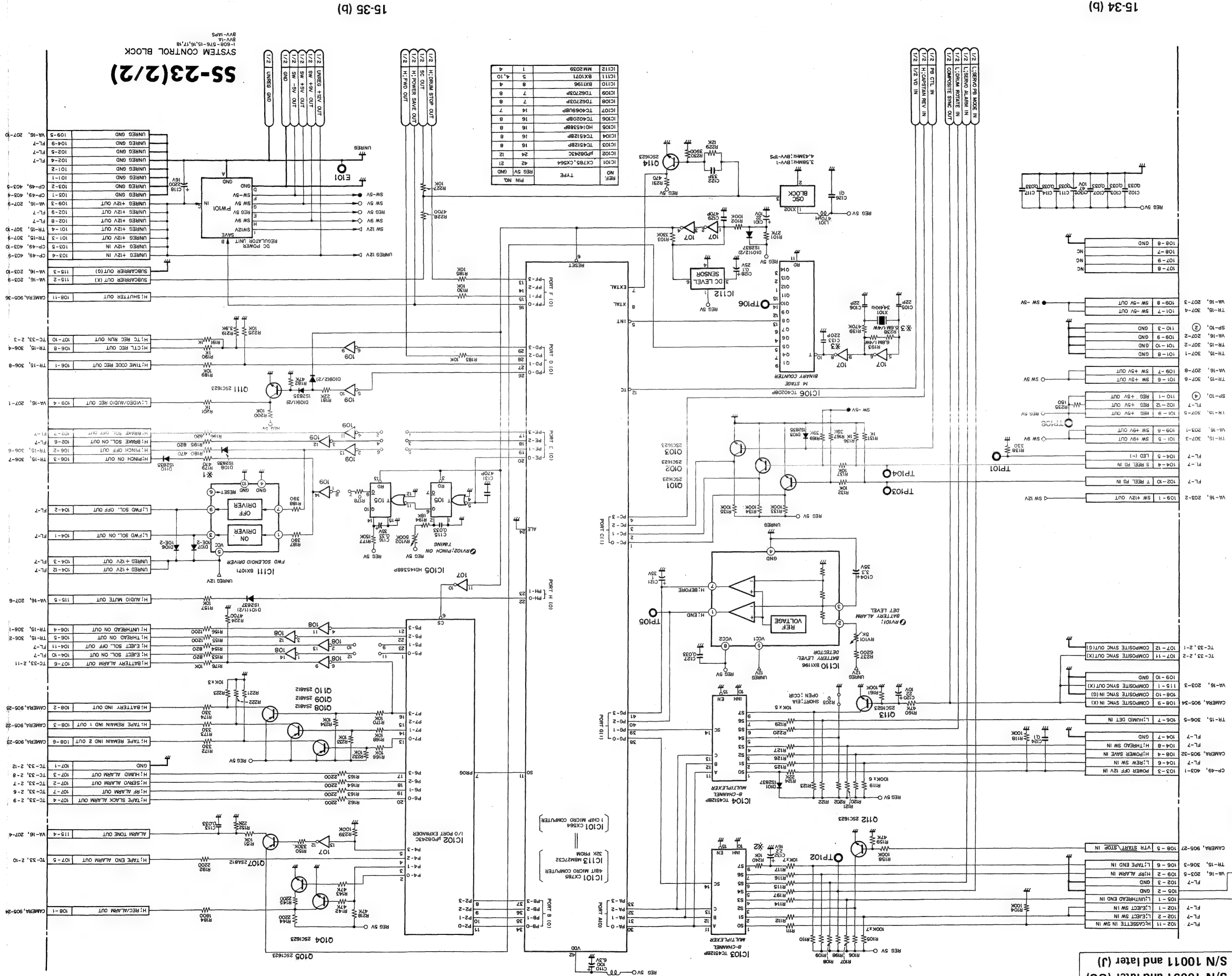
SS-23 (2/2) (SYSTEM CONTROL) S/N 10091 and later (U)  
SW-82 S/N 10011 and later (U)  
DUS-40



NOTE:

MARK	CHANGE INFORMATION	SERIAL NO.
#1	CHANGED	UC: 10171
	PS: 10011	
#2	ADDED	UC: 10191
	PS: 10341	
#3	CHANGED	UC: 10503
	PS: 10503	
	C132 2.2 μ	
	R240 10K	
	PS: 10341	
	UC: 10503	
	PS: 10503	

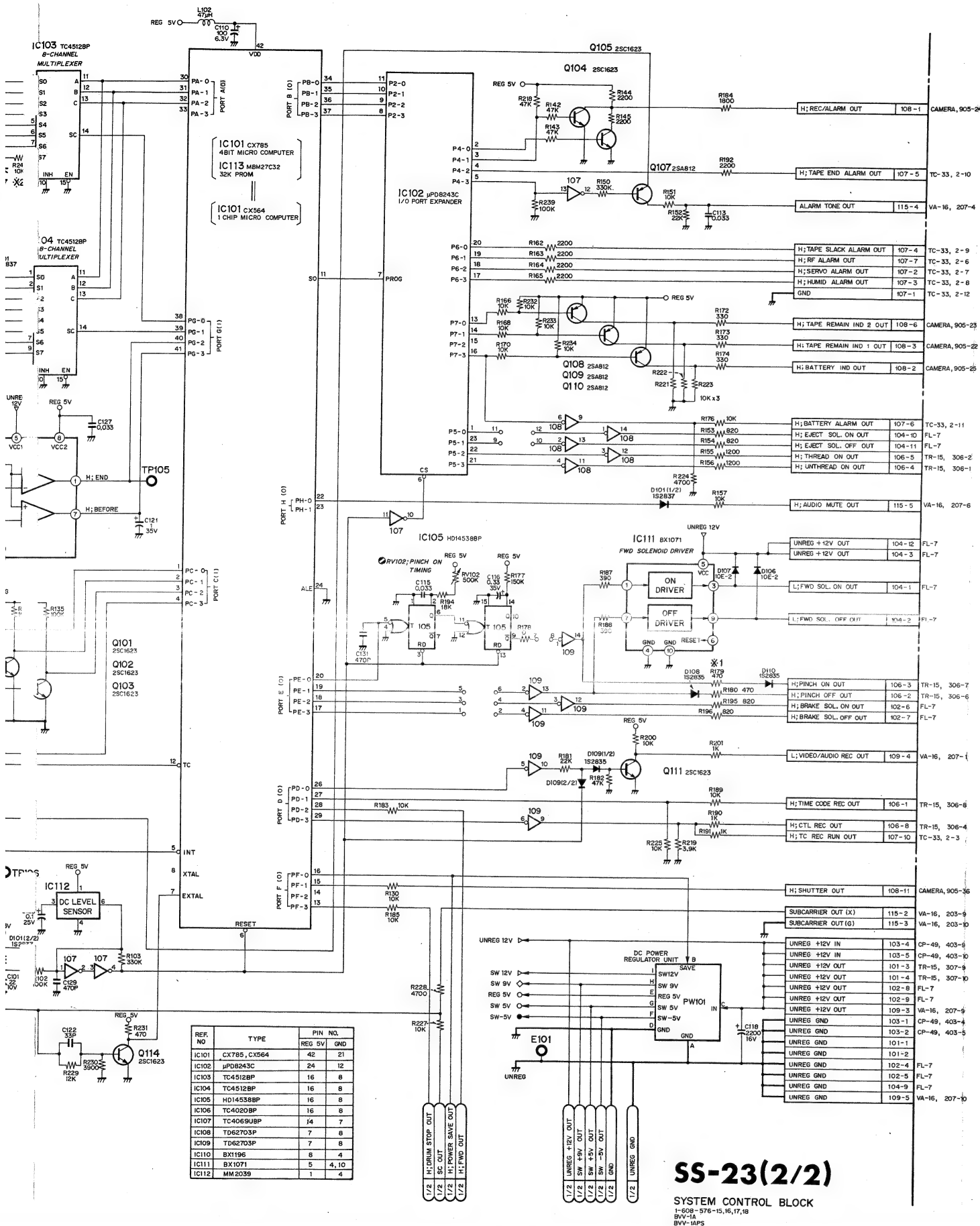
Ref.	Q4	C3	C26	R22	R23	R25	R50	R57	R58	R59	R203	R51	R56	X102
	0.1 μ	22 μ	0.015 μ	15K	27K	100K	47K	27K	4.7K	10K	OPEN	OPEN	20K	3.58 MHz
	NTSC													50K
														4.43 MHz



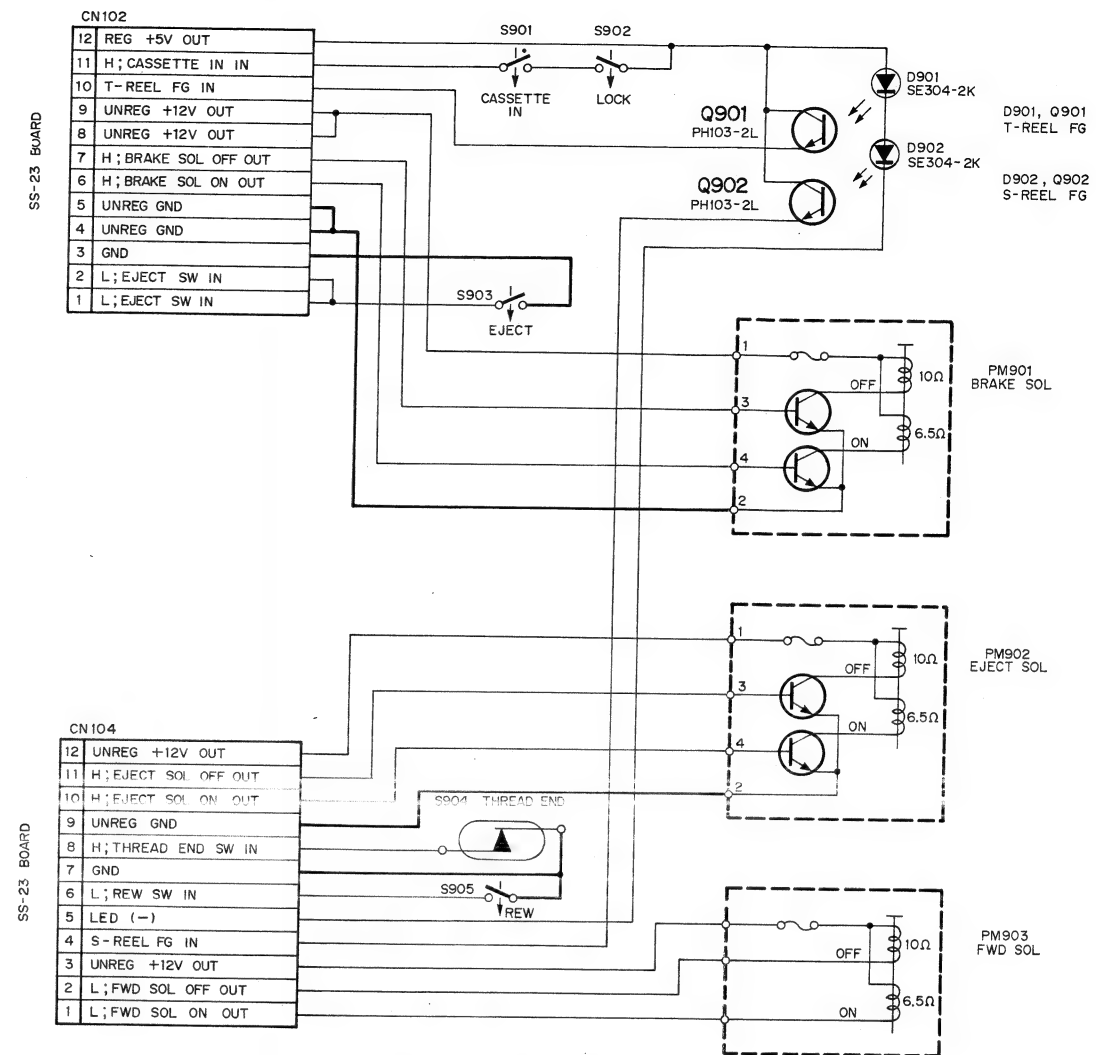
15-34 (b)

15-35 (b)

FL-7



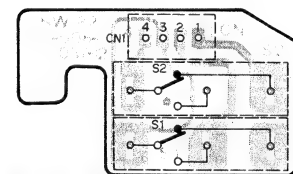
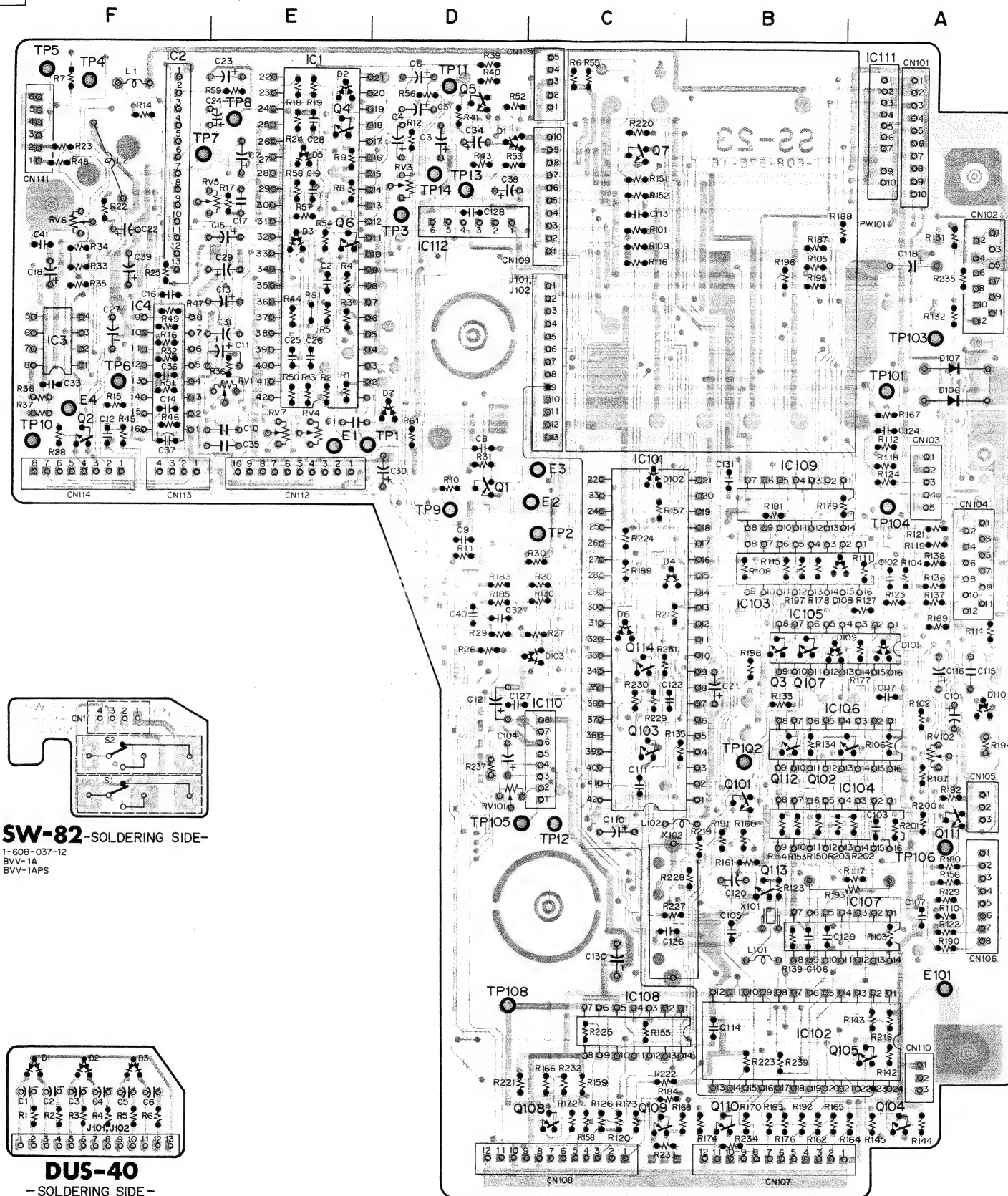
15-35 (b)



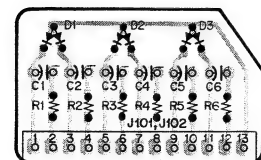
15-36 (b)

SS-23 (SYSTEM CONTROL)  
SW-82  
DUS-40

S/N 10091 to 40502 (UC)  
S/N 10011 to 10535 (J)



**SW-82-SOLDERING SIDE-**  
1-608-037-12  
BVV-1A  
BVV-1APS



**DUS-40**  
-SOLDERING SIDE-  
1-614-110-11,12  
BVV-1A  
BVV-1APS

CN101 A-1  
CN102 A-2  
CN103 A-3  
CN104 A-4  
CN105 A-5  
CN106 A-6  
CN107 B-7  
CN108 C-7  
CN109 C-1  
CN110 A-7  
CN111 F-1  
CN112 E-3  
CN113 F-3  
CN114 F-3  
CN115 C-1

D1 D-1  
D2 E-1  
D3 E-2  
D4 C-4  
D5 E-1  
D6 C-4  
D7 D-3  
D101 A-4  
D102 C-3  
D103 C-4  
D106 A-3  
D107 A-3  
D108 B-4  
D109 B-4  
D110 A-5

E1 E-3  
E2 C-3  
E3 C-3  
E4 F-3  
E101 A-6

IC1 E-1  
IC2 F-1  
IC3 F-2  
IC4 F-3  
IC101 C-4  
IC102 B-7  
IC103 B-4  
IC104 B-5  
IC105 B-4  
IC106 B-5  
IC107 B-6  
IC108 C-7  
IC109 B-3  
IC110 C-5  
IC111 A-1  
IC112 D-2

PW101 B-2

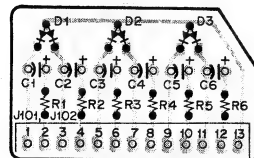
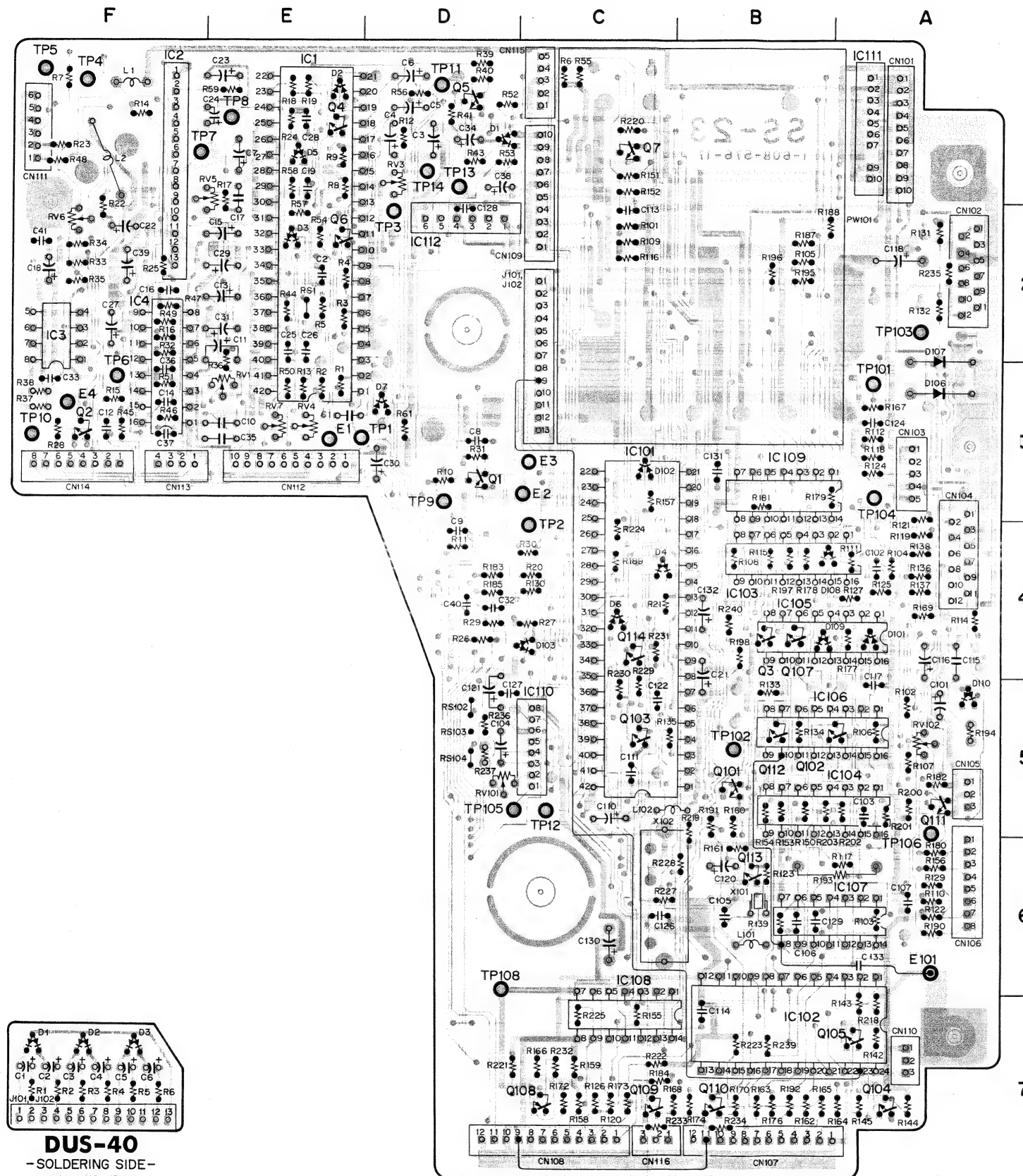
Ref.	NTSC	PAL
C4	0.1 $\mu$	0.22 $\mu$
C23	22 $\mu$	47 $\mu$
C25	0.015 $\mu$	0.1 $\mu$
R22	15K	10K
R23	27K	47K
R25	100K	330K
R50	27K	47K
R57	4.7K	8.2K
R58	15K	SHORT
R59	10K	5.6K
R203	SHORT	OPEN
RS1	OPEN	SHORT
RV5	20K	50K
X102	3.58 MHz	4.43 MHz

**SS-23 - COMPONENT SIDE-**  
1-608-576-15,16  
BVV-1A  
BVV-1APS

# SS-23, DUS-40 SS-23, DUS-40

SS-23 (SYSTEM CONTROL)  
DUS-40

S/N 40503 and later (UC)  
S/N 10536 and later (J)



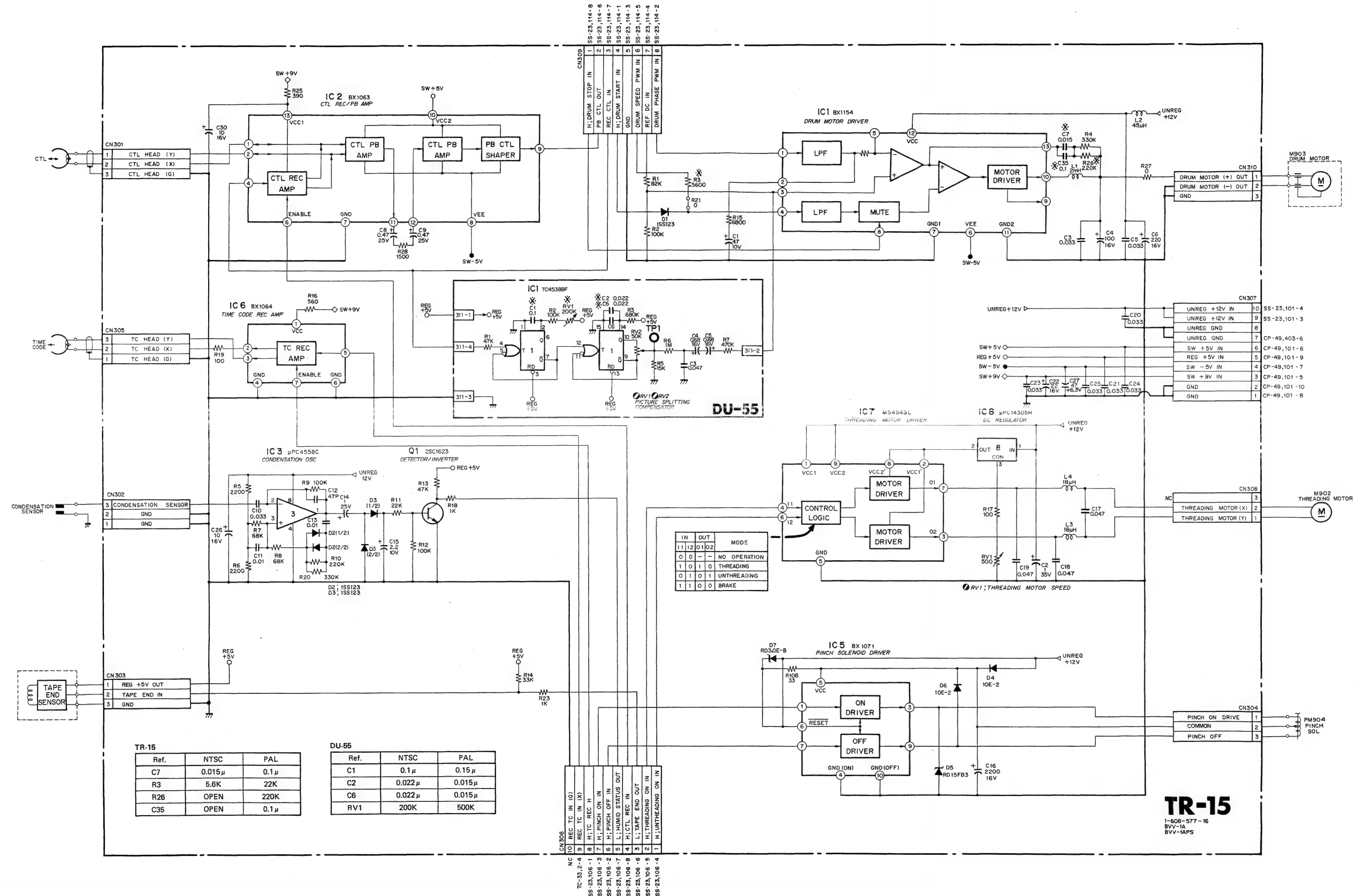
**DUS-40**  
- SOLDERING SIDE -  
1-614-110-13  
BVV-1A  
BVV-1APS

**SS-23 - COMPONENT SIDE -**  
1-608-576-17,18  
BVV-1A  
BVV-1APS

CN101 A - 1	Q1 D - 3
CN102 A - 2	Q2 F - 3
CN103 A - 3	Q3 B - 4
CN104 A - 4	Q4 E - 1
CN105 A - 5	Q5 D - 1
CN106 A - 6	Q6 E - 2
CN107 B - 7	Q7 C - 1
CN108 C - 7	Q101 B - 5
CN109 C - 1	Q102 A - 5
CN110 A - 7	Q103 C - 5
CN111 F - 1	Q104 A - 7
CN112 E - 3	Q105 A - 7
CN113 F - 3	Q107 B - 4
CN114 F - 3	Q108 C - 7
CN115 C - 1	Q109 C - 7
CN116 C - 7	Q110 B - 7
D1 D - 1	Q111 A - 5
D2 E - 1	Q112 B - 5
D3 E - 2	Q113 B - 6
D4 C - 4	Q114 C - 4
D5 E - 1	RV1 E - 3
D6 C - 4	RV3 D - 1
D7 D - 3	RV4 E - 3
D101 A - 4	RV5 F - 1
D102 C - 3	RV6 F - 2
D103 C - 4	RV7 E - 3
D106 A - 3	RV101 D - 5
D107 A - 3	RV102 A - 5
D108 B - 4	
D109 B - 4	
D110 A - 5	
E1 E - 3	TP1 D - 3
E2 C - 3	TP2 C - 4
E3 C - 3	TP3 D - 2
E4 F - 3	TP4 F - 1
E101 A - 6	TP5 F - 1
	TP6 F - 3
	TP7 F - 1
	TP8 E - 1
	TP9 D - 3
	TP10 F - 3
	TP11 D - 1
	TP12 C - 5
	TP13 D - 1
	TP14 D - 1
	TP101 A - 3
	TP102 B - 5
	TP103 A - 2
	TP104 A - 3
	TP105 D - 5
	TP106 A - 5
	TP108 D - 6
	X101 B - 6
	X102 C - 6
PW101 B - 2	

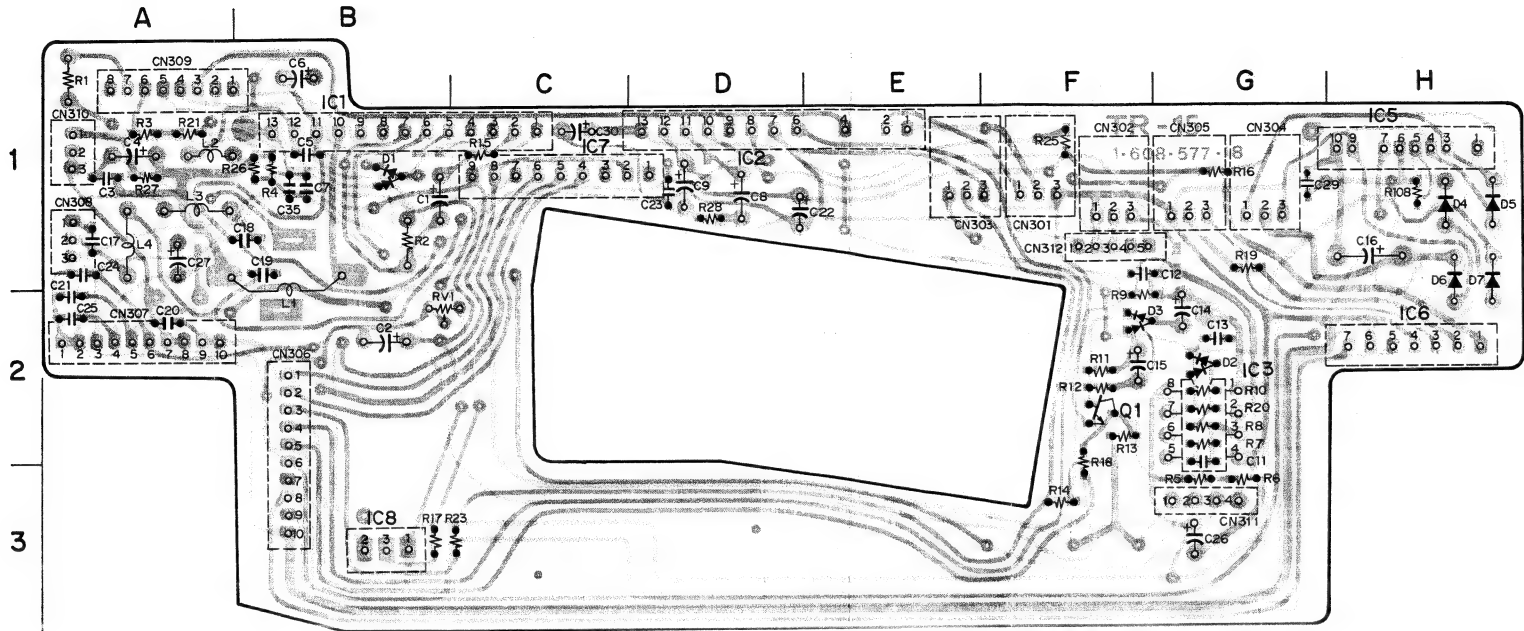
Ref.	NTSC	PAL
C4	0.1 $\mu$	0.22 $\mu$
C23	22 $\mu$	47 $\mu$
C25	0.015 $\mu$	0.1 $\mu$
R22	15K	10K
R23	27K	47K
R25	100K	330K
R50	27K	47K
R57	4.7K	8.2K
R58	15K	SHORT
R59	10K	5.6K
R203	SHORT	OPEN
RS1	OPEN	SHORT
RV5	20K	50K
X102	3.58 MHz	4.43 MHz



TR-15  
DU-55S/N 10001 to 10170 (UC)  
S/N 10001 to 10010 (J)

TR-15  
DU-55  
DUS-35

S/N 10171 and later (UC)  
S/N 10011 and later (J)



- D1 B - 1
- D2 G - 2
- D3 F - 2
- D4 H - 1
- D5 H - 1
- D6 H - 2
- D7 H - 1
- IC1 B - 1
- IC2 D - 1
- IC3 G - 2
- IC5 H - 1
- IC6 H - 2
- IC7 C - 1
- IC8 B - 3
- Q1 F - 2
- RV1 B - 2

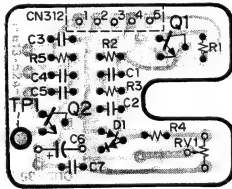
TR-15

Ref.	NTSC	PAL
C7	0.015 $\mu$	0.1 $\mu$
R3	5.6K	22K
R26	OPEN	220K
C35	OPEN	0.1 $\mu$

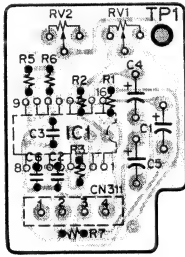
DU-55

Ref.	NTSC	PAL
C1	0.1 $\mu$	0.15 $\mu$
C2	0.022 $\mu$	0.015 $\mu$
C6	0.022 $\mu$	0.015 $\mu$
RV1	200K	500K

TR-15 - SOLDERING SIDE -  
1-608-577-17,18  
BVV-1A  
BVV-1APS



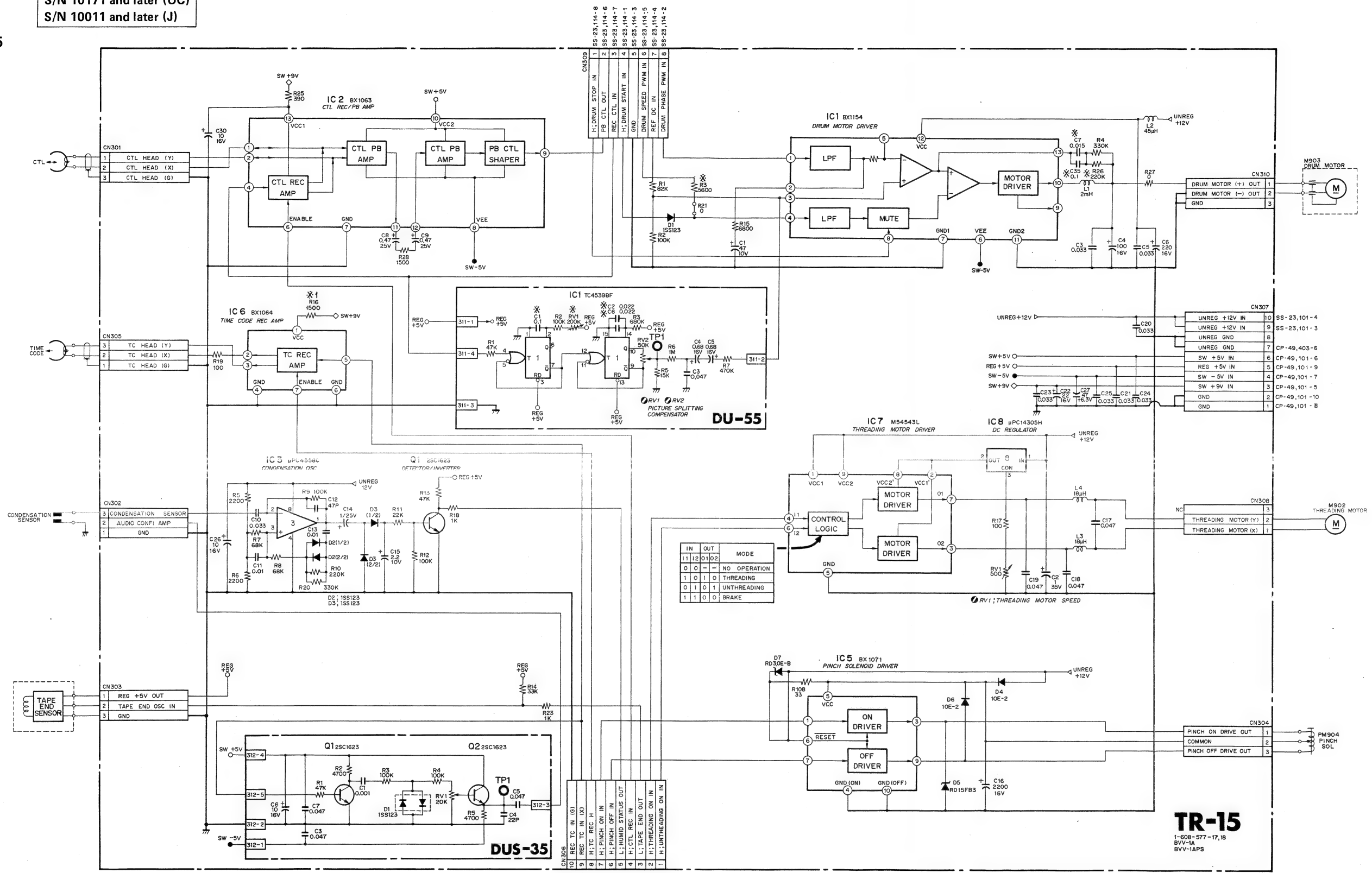
DUS-35  
-SOLDERING SIDE -  
1-613-524-11,12  
BVV-1A  
BVV-1APS



DU-55  
-SOLDERING SIDE -  
1-610-849-15  
BVV-1A  
BVV-1APS

TR-15  
DU-55  
DUS-35

S/N 10171 and later (UC)  
S/N 10011 and later (J)



DU-55

Ref.	NTSC	PAL
C1	0.1μ	0.15μ
C2	0.022μ	0.015μ
C6	0.022μ	0.015μ
RV1	200K	500K

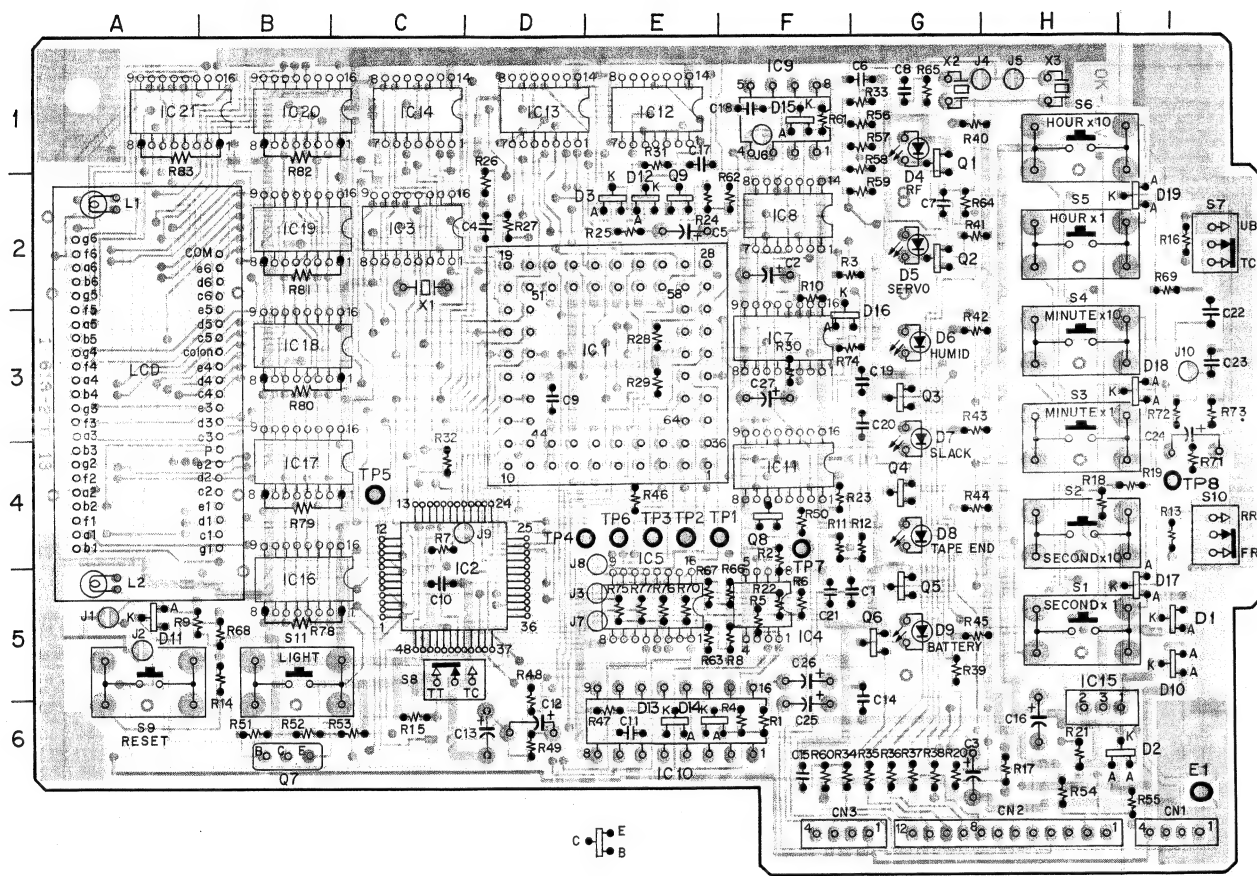
TR-15

Ref.	NTSC	PAL
C7	0.015μ	0.1μ
R3	5.6K	22K
R26	OPEN	220K
C35	OPEN	0.1μ

NOTE:

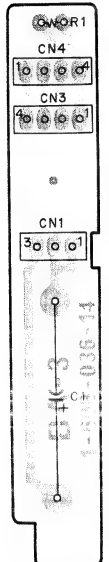
MARK	CHANGE INFORMATION	SERIAL NO.
※ 1	R16 560 → 1500	UC: 40503 ~ J: 10536 ~ PS: 11026 ~

TC-33 (TIME CODE GENERATOR)  
BA-3  
UP TO S/N 40323 (UC)  
UP TO S/N 10475 (J)



TC-33-SOLDERING SIDE-  
1-613-270-11,12,13  
BVV-1A  
BVV-1APS

CN1	I-6	Q1	G-1
CN2	H-6	Q2	G-2
CN3	F-6	Q3	G-3
		Q4	G-4
		Q5	G-5
D1	I-5	Q6	G-5
D2	I-6	Q7	B-6
D3	E-2	Q8	F-4
D4	G-1	Q9	E-2
D5	G-2		
D6	G-3	S1	H-5
D7	G-4	S2	H-4
D8	G-4	S3	H-4
D9	G-5	S4	H-3
D10	I-5	S5	H-2
D11	A-5	S6	H-1
D12	E-2	S7	I-2
D13	E-6	S8	C-5
D14	F-6	S9	A-5
D15	F-1	S10	I-4
D16	F-3	S11	B-5
D17	H-5		
D18	I-3	TP1	E-4
D19	I-2	TP2	E-4
		TP3	E-4
E1	I-6	TP4	E-4
		TP5	C-4
IC1	E-3	TP6	E-4
IC2	C-5	TP7	F-4
IC3	C-2	TP8	I-4
IC4	F-5		
IC5	E-5	X1	C-2
IC7	F-3	X2	G-1
IC8	F-2	X3	H-1
IC9	F-1		
IC10	E-6		
IC11	F-4		
IC12	E-1		
IC13	D-1		
IC14	C-1		
IC15	H-6		
IC16	B-5		
IC17	B-4		
IC18	B-3		
IC19	B-2		
IC20	B-1		
IC21	A-1		



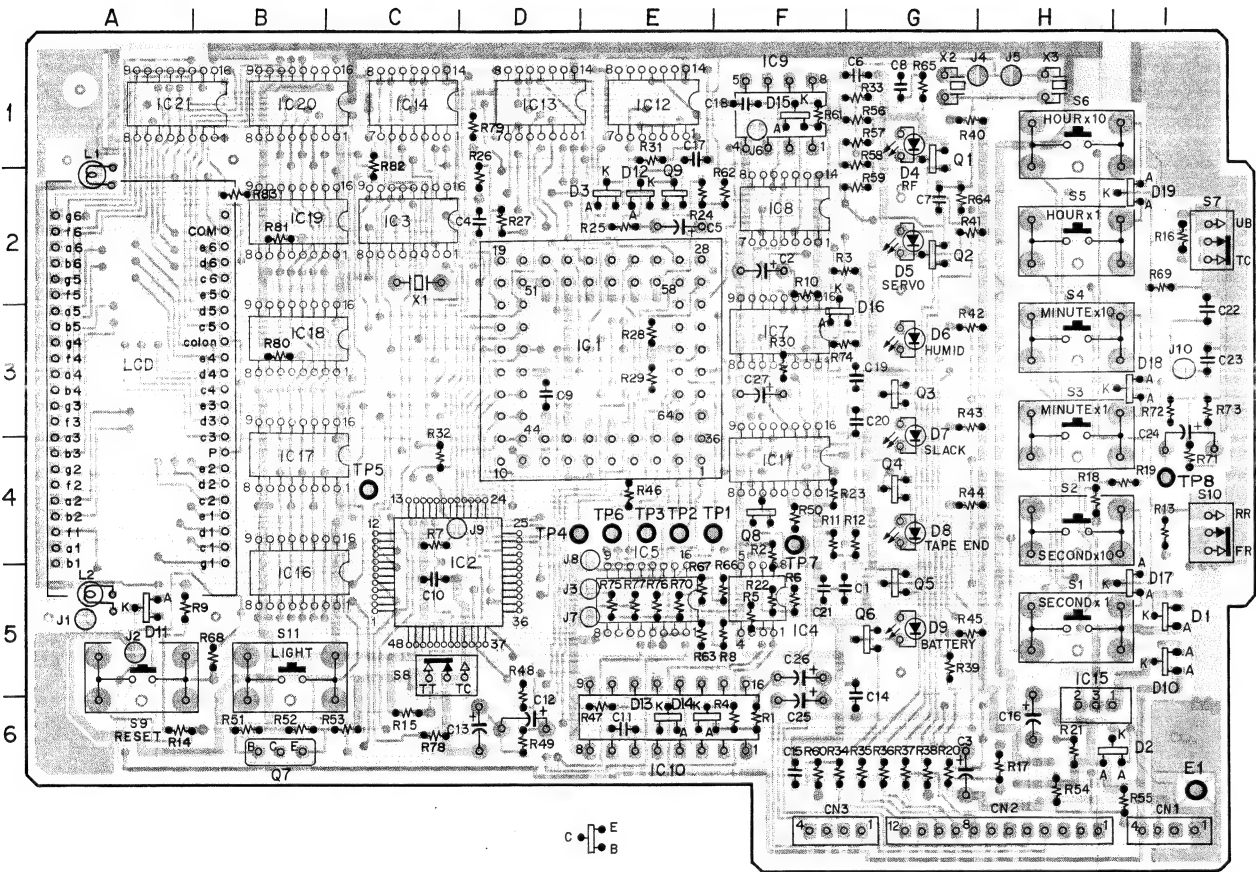
BA-3  
-SOLDERING SIDE-  
1-608-036-11  
BVV-1A  
BVV-1APS

TC-33, BA-3

TC-33, BA-3

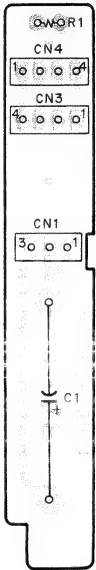
TC-33 (TIME CODE GENERATOR)  
BA-3

S/N 40324 and later (UC)  
S/N 10476 and later (J)



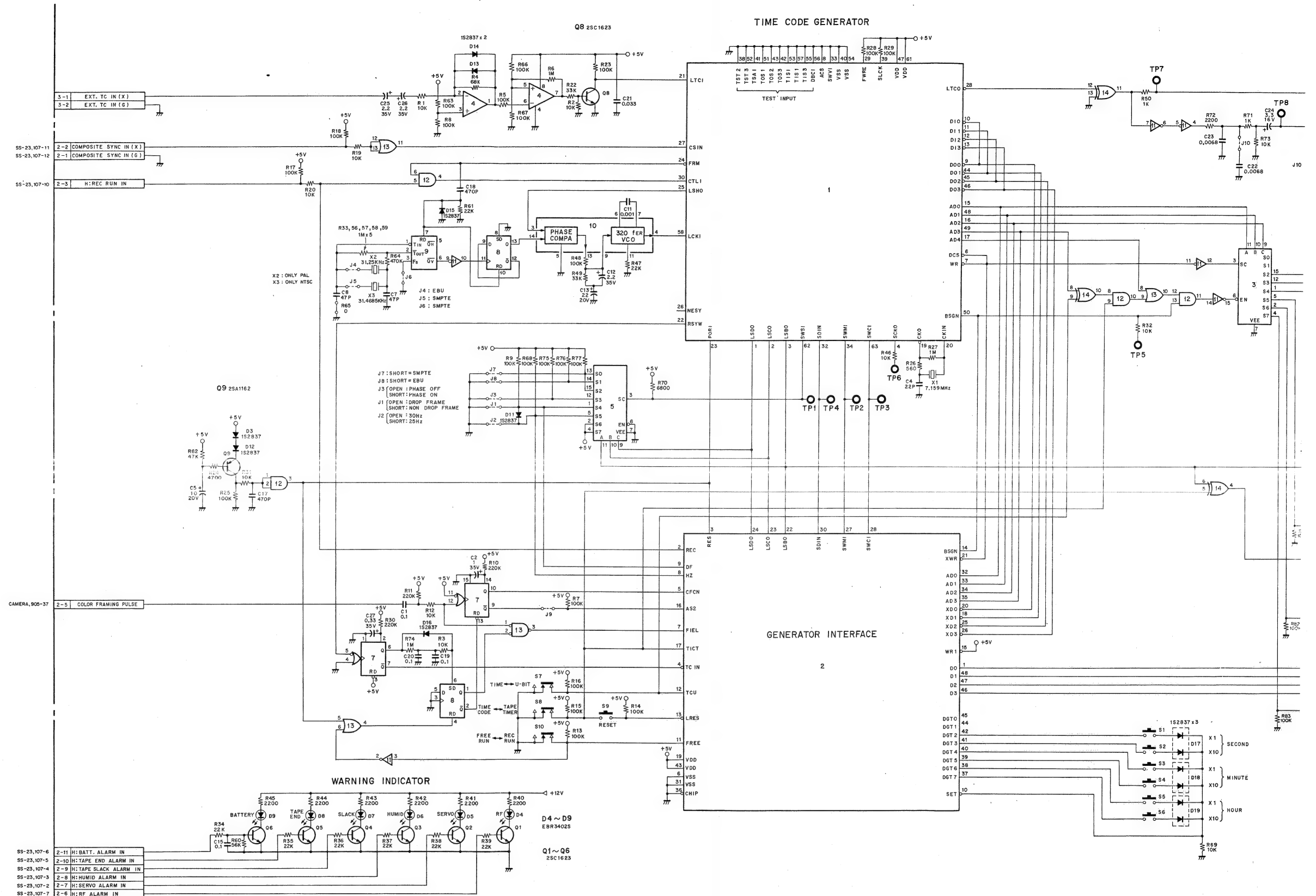
TC-33-SOLDERING SIDE-  
1-613-270-14  
BVV-1A  
BVV-1APS

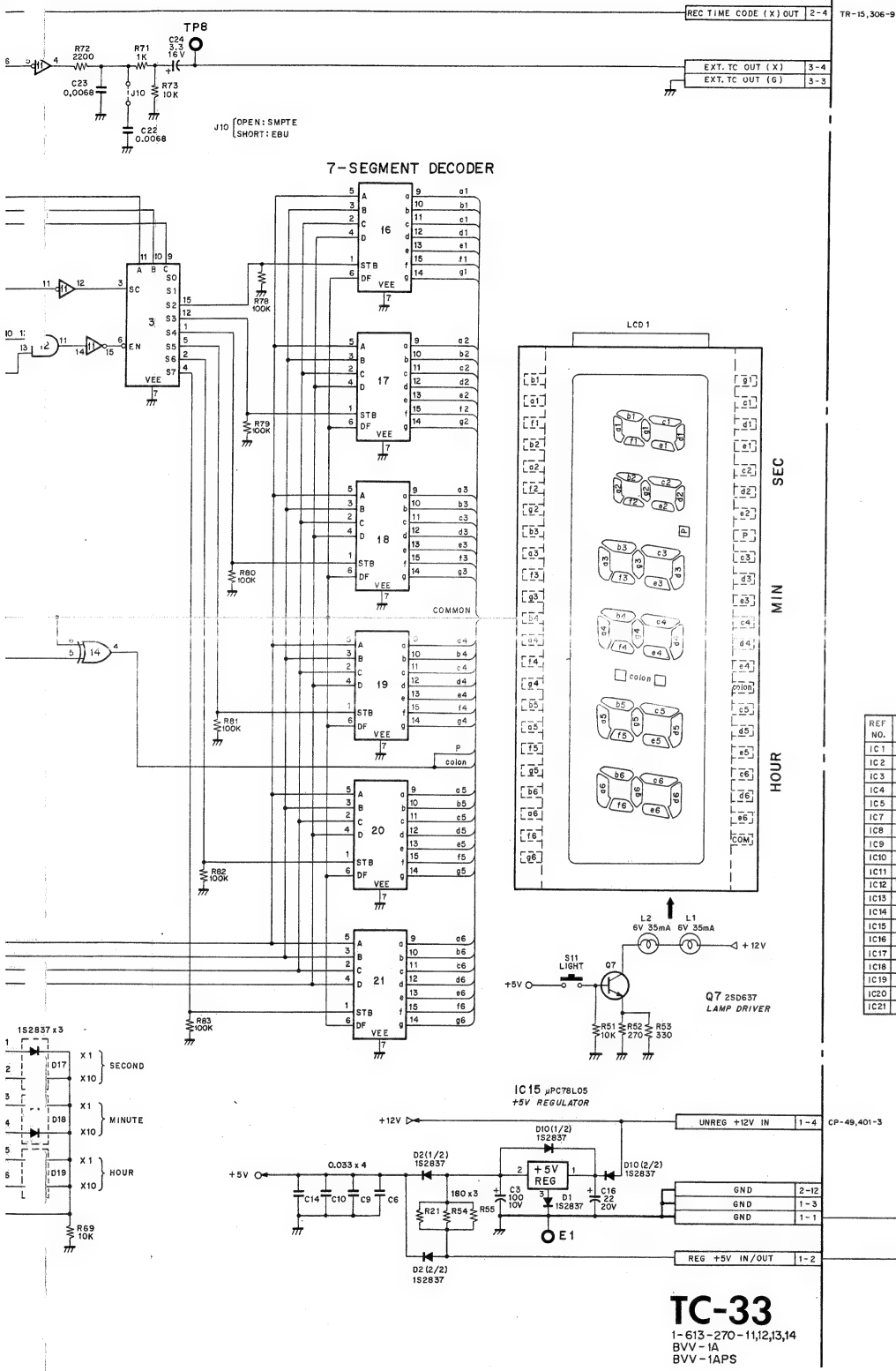
CN1	I-6	Q1	G-1
CN2	H-6	Q2	G-2
CN3	F-6	Q3	G-3
		Q4	G-4
		Q5	G-5
		Q6	G-6
		Q7	B-6
		Q8	F-4
		Q9	E-2
D1	I-5	S1	H-5
D2	I-6	S2	H-4
D3	E-2	S3	H-4
D4	G-1	S4	H-3
D5	G-2	S5	H-2
D6	G-3	S6	H-1
D7	G-4	S7	I-2
D8	G-4	S8	C-5
D9	G-5	S9	A-5
D10	I-5	S10	I-4
D11	A-5	S11	B-5
D12	E-2		
D13	E-6	TP1	E-4
D14	F-6	TP2	E-4
D15	F-1	TP3	E-4
D16	F-2	TP4	E-4
D17	H-5	TP5	C-4
D18	I-3	TP6	E-4
D19	I-2	TP7	F-4
		TP8	I-4
E1	I-6	X1	C-2
		X2	G-1
		X3	H-1
IC1	E-3		
IC2	C-5		
IC3	C-2		
IC4	F-5		
IC5	E-5		
IC7	F-3		
IC8	F-2		
IC9	F-1		
IC10	E-6		
IC11	F-4		
IC12	E-1		
IC13	D-1		
IC14	C-1		
IC15	H-6		
IC16	B-5		
IC17	B-4		
IC18	B-3		
IC19	B-2		
IC20	B-1		
IC21	A-1		



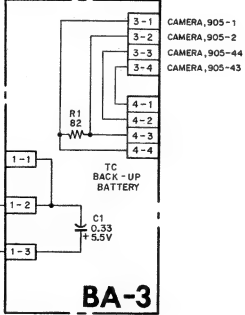
BA-3  
-SOLDERING SIDE-  
1-608-036-11  
BVV-1A  
BVV-1APS

TC-33 (TIME CODE GENERATOR)  
BA-3





REF NO.	TYPE	PIN NO.
IC1	CX7907A	47,61 40,54
IC2	CX23051	19,43 6,31
IC3	TC4051BF	16 8
IC4	TL062CPS	8 4
IC5	TC4051BF	16 8
IC7	TC4539BF	16 8
IC8	TC4013BF	14 7
IC9	SM6430C	8 4
IC10	HD14046BP	16 8
IC11	TC4049BF	16 8
IC12	TC4081BF	14 7
IC13	TC4071BF	14 7
IC14	TC4030BF	14 7
IC15	$\mu$ PC78L05	- -
IC16	TC4056BF	16 8
IC17	TC4056BF	16 8
IC18	TC4056BF	16 8
IC19	TC4056BF	16 8
IC20	TC4056BF	16 8
IC21	TC4056BF	16 8



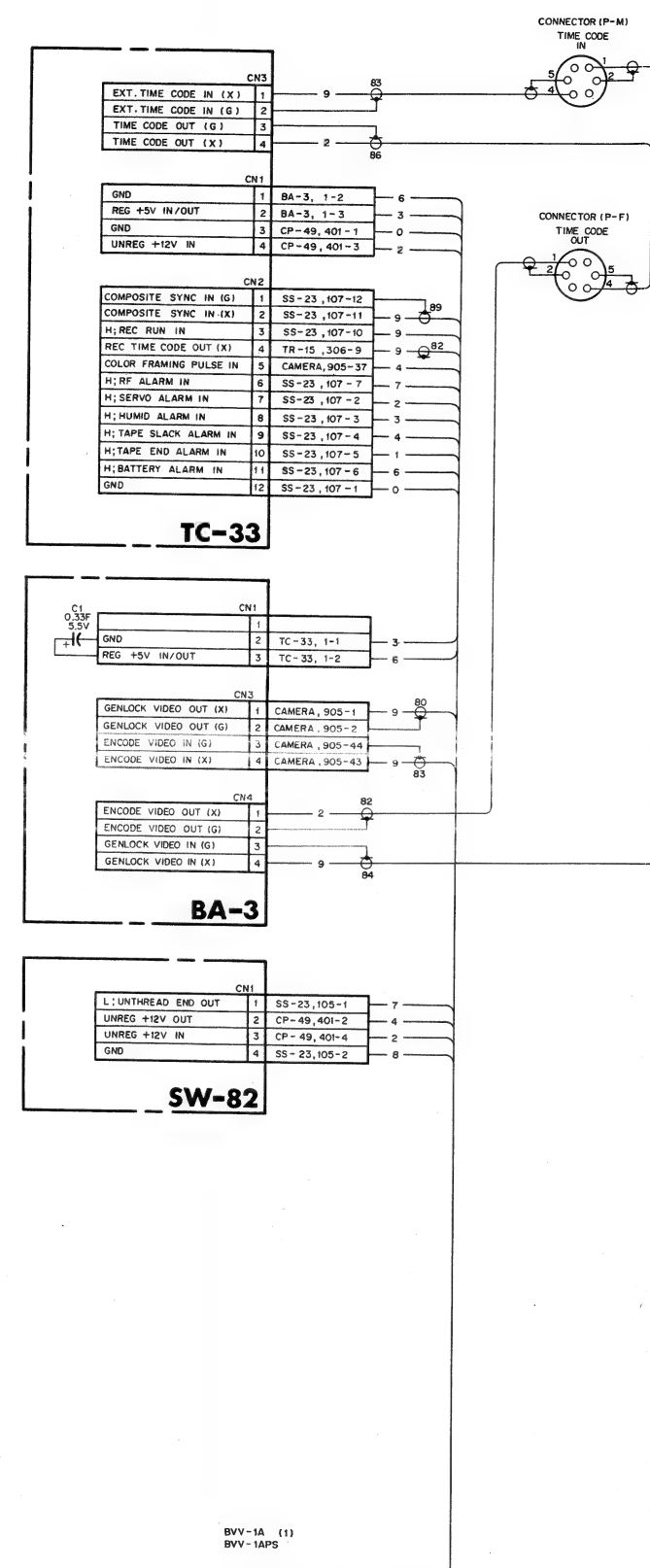
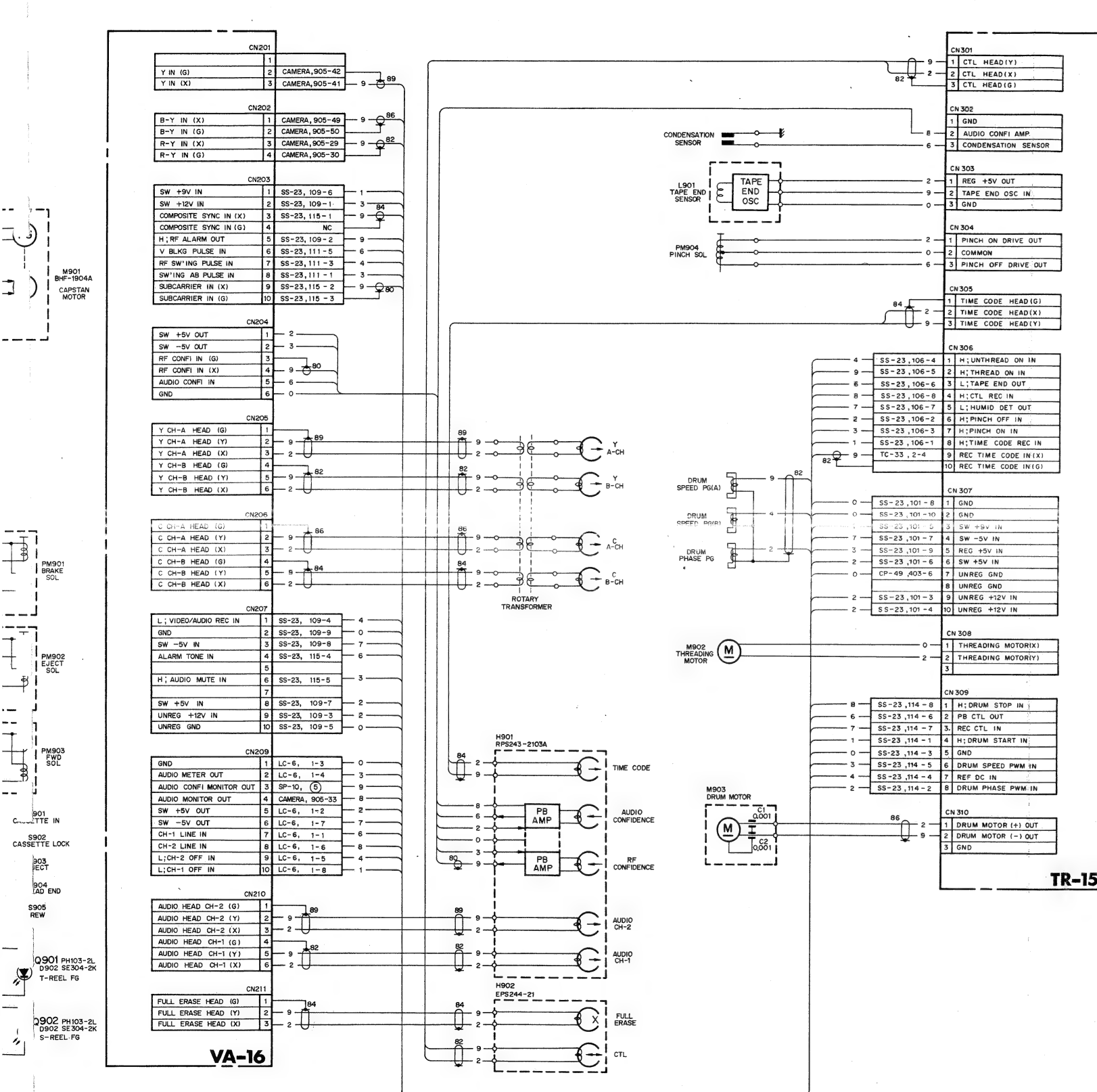


## FRAME WIRING





## FRAME WIRING



## SECTION 16

### SPARE PARTS AND FIXTURE

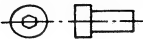
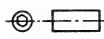
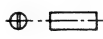
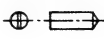
#### 16-1. PARTS INFORMATION

1. **Safety Related Component Warning**  
Components identified by shading marked with **A** on the schematic diagrams, exploded views and electrical spare parts list are critical to safe operation. Replace these components with Sony parts whose parts numbers appear as shown in this manual or in service bulletins and service manual supplements published by Sony.
2. **Replacement Parts** supplied from Sony Parts Center will sometimes have different shape and outside view from the parts which actually in use. This is due to "accommodating the improved parts and/or engineering changes" or "standardization of genuine parts".
  - This manual's exploded views and electrical spare parts lists are indicating the parts numbers of "the standardized genuine parts at present".
  - Regarding engineering parts changes in our engineering department, refer Sony service bulletins and service manual supplements.
3. **Printed Components in Bold-Face type** on the exploded views and electrical spare parts list are normally stocked for replacement purposes. The remaining parts are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.
4. **Item with no part number and/or no description** are not stocked because they are seldom required for routine service.
5. ( T ) after a spring description is shown on the exploded views in order to indicate the number of a spring turn required for the use.  
(Example) Spring, tension (24T); This spring must be cut at its 24th turn for actual use.







#### 16-2. EXPLODED VIEW

- Exploded views are composed of the following blocks
  - (1) Reel Chassis Block (1) (Left Side)
  - (2) Reel Chassis Block (2) (Right Side)
  - (3) Drum, Stationary Head, Tape Guide and Capstan Blocks
  - (4) Threading Ring, Motor and Switch Blocks
  - (5) Pinch Press Mechanism Block
  - (6) Ring Stopper Assembly Block
  - (7) Gear Assembly Block
  - (8) Reel Chassis Block (3) (Back side)
  - (9) Cassette-up Compartment Block
  - (10) Battery Case and P.C.B. (Printed Circuit Board) Blocks
  - (11) Ornamental Panel Block
  - (12) Side Panel Block (1)
  - (13) Side Panel Block (2)
  - (14) VSW (VTR Switch) Block






# SCREW


	<b>HEXAGON SOCKET SCREW</b> 	<b>HEXAGON SET SCREW</b> 	<b>(-) SET SCREW FLAT POINT</b> 	<b>(-) SET SCREW CONE POINT</b> 
2.6 x 3	_____	7-621-734-09	_____	_____
2.6 x 4	7-621-996-24	7-621-735-09	_____	_____
2.6 x 5	_____	7-621-736-09	_____	_____
2.6 x 6	7-683-412-05	_____	_____	7-621-712-55
2.6 x 8	7-683-413-05	_____	_____	7-621-712-65
2.6 x 10	_____	_____	_____	7-621-712-75
3 x 4	_____	7-683-238-01	_____	_____
3 x 5	_____	_____	7-683-175-01	_____
3 x 6	7-683-403-04	_____	7-683-176-01	7-683-176-21
3 x 8	7-683-404-04	_____	_____	7-683-177-21
3 x 10	7-683-405-04	_____	_____	7-683-178-21
3 x 12	_____	_____	_____	7-683-179-21

# SCREW

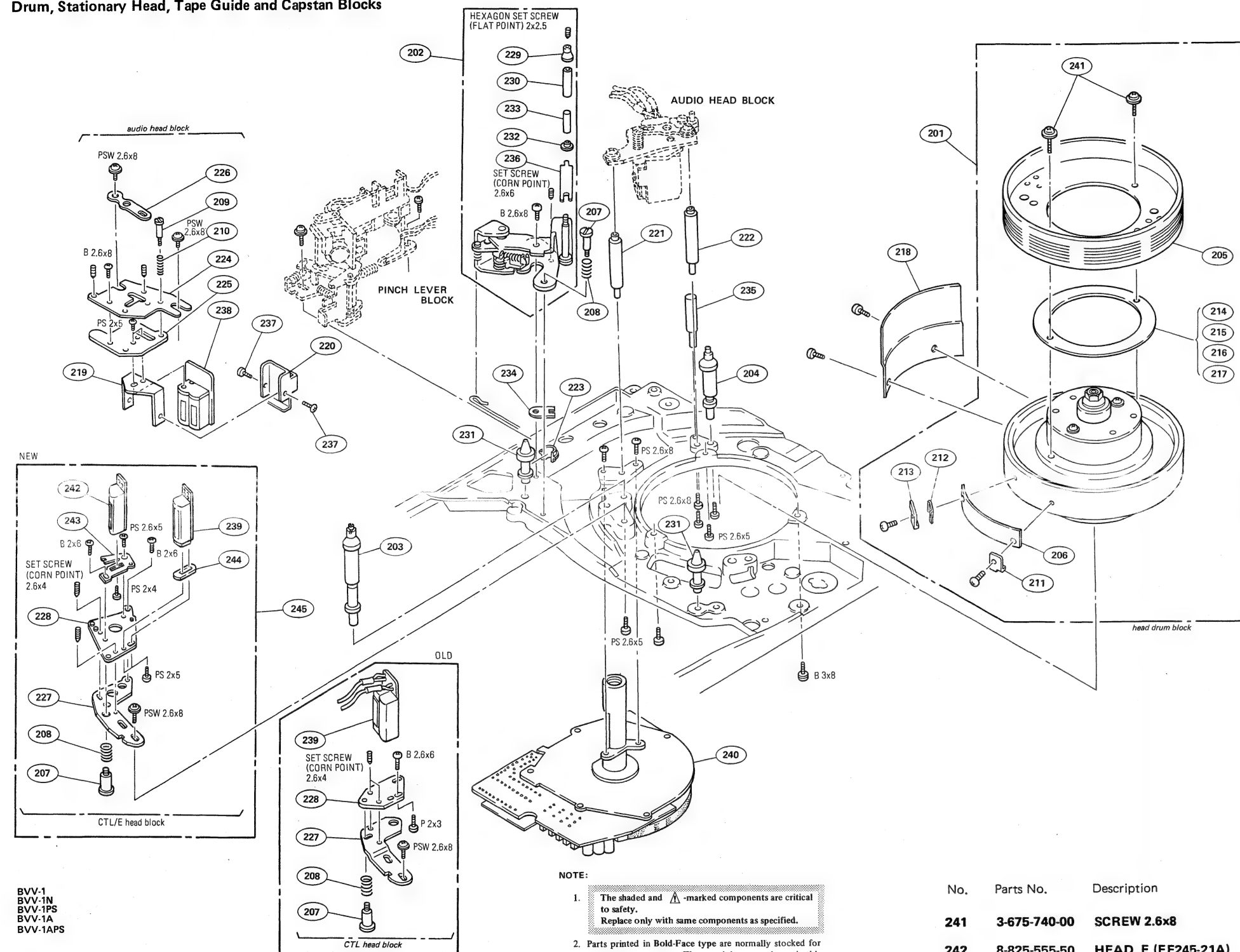
	PS 	PSW 	B (BZn-N) 	B (Cr-N) 	PTT 	PTTWH 
2.6 x 4	7-621-972-05	—	7-621-912-10	7-621-912-18	—	7-687-508-31
2.6 x 6	7-621-972-25	7-621-981-15	7-621-912-30	7-621-912-38	—	7-687-501-31
2.6 x 8	7-621-972-35	7-621-981-25	7-621-912-40	7-621-912-48	—	7-687-502-31
2.6 x 10	7-621-972-45	7-621-981-35	7-621-912-50	7-621-912-58	—	7-687-503-31
2.6 x 12	7-621-972-55	7-621-981-45	7-621-912-60	7-621-912-68	—	7-687-504-31
2.6 x 14	7-621-972-65	7-621-981-55	7-621-912-70	7-621-912-78	—	7-687-505-31
2.6 x 16	7-621-972-75	7-621-981-65	7-621-912-80	7-621-912-88	—	7-687-506-31
2.6 x 20	7-621-972-85	7-621-981-75	7-621-912-90	7-621-912-98	—	7-687-507-31
3 x 5	7-686-446-01	—	—	—	—	—
3 x 6	7-686-447-01	7-686-527-01	7-686-624-09	7-686-624-04	7-687-411-31	7-687-510-31
3 x 8	7-686-448-01	7-686-528-01	7-686-625-09	7-686-625-04	7-687-412-31	7-687-511-31
3 x 10	7-686-449-01	7-686-529-01	7-686-626-09	7-686-626-04	7-687-413-31	7-687-512-31
3 x 12	7-686-450-01	7-686-530-01	7-686-627-09	7-686-627-04	7-687-414-31	7-687-513-31
3 x 16	7-686-452-01	7-686-532-01	7-686-629-09	7-686-629-04	—	—
3 x 20	7-686-453-01	7-686-533-01	7-686-630-09	7-686-630-04	—	—
3 x 25	7-686-454-01	7-686-534-01	7-686-631-09	7-686-631-04	—	—
4 x 8	7-686-468-01	7-686-548-01	7-686-635-09	7-686-635-04	—	—
4 x 12	7-686-470-01	7-686-550-01	7-686-637-09	7-686-637-04	—	—
4 x 14	7-686-471-01	—	7-686-638-09	7-686-638-04	—	—
4 x 16	7-686-472-01	—	7-686-639-09	7-686-639-04	—	—
4 x 20	7-686-473-01	—	7-686-640-09	7-686-640-04	—	—

WASHER

	FLAT WASHER SMALL W. 	FLAT WASHER MIDDLE W. 	SPRING WASHER SW. 	TOOTHED WASHER TYPE B LW. 	HEXAGON NUT N. 
2.6 mm	7-688-002-01	7-688-002-12	7-623-207-22	7-623-421-07	7-622-207-05
3 mm	7-688-003-01	7-688-003-12	7-688-003-11	7-623-422-07	7-684-023-04
4 mm	7-688-004-01	7-688-004-12	7-623-210-22	7-623-423-07	7-684-024-04
5 mm	7-688-005-01	7-688-005-01	7-623-212-22	—	7-684-025-04

	STOP RING E TYPE E. 
2	7-624-104-04
2.3	7-624-105-04
3	7-624-106-04
4	7-624-108-04
5	7-624-109-04
6	7-624-110-04

## Drum, Stationary Head, Tape Guide and Capstan Blocks



BVV-1  
 BVV-1N  
 BVV-1PS  
 BVV-1A  
 BVV-1APS

### NOTE:

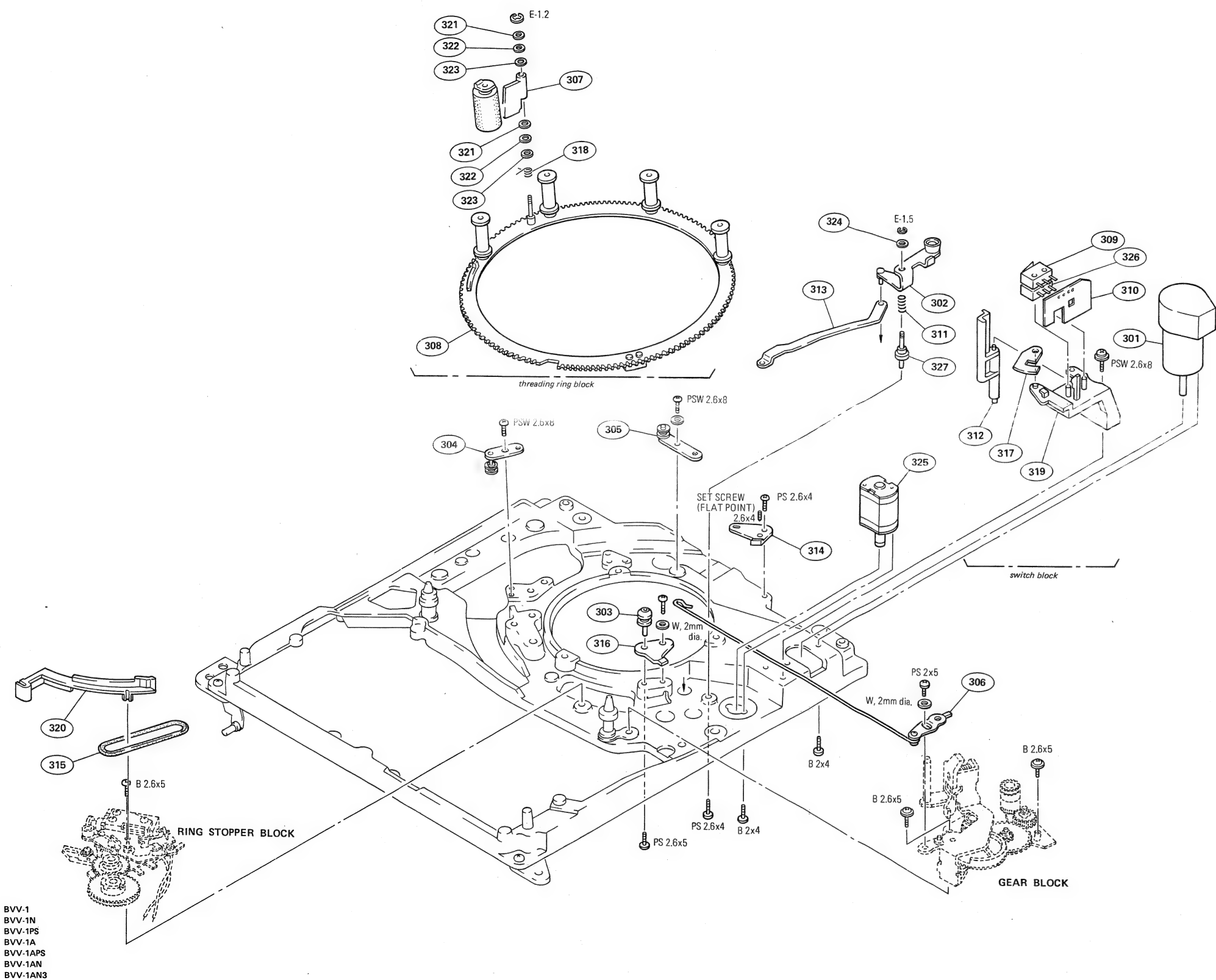
- The shaded and  $\Delta$ -marked components are critical to safety. Replace only with same components as specified.
- Parts printed in Bold-Face type are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.
- Item with no part number and/or no description are not stocked because they are seldom required for routine service.
- UC: S/N 40260 AND LOWER  
J: S/N 10425 AND LOWER  
PS: S/N 10815 AND LOWER
- UC: S/N 40261 AND HIGHER  
J: S/N 10426 AND HIGHER  
PS: S/N 10816 AND HIGHER

No.	Parts No.	Description
201	A-6050-165-A	DRUM ASS'Y, DSH-28A-R
202	A-6742-044-A	TENSION REGULATOR ASS'Y
203	A-6746-023-A	GUIDE ASS'Y, ENTRANCE
204	A-6746-024-A	GUIDE ASS'Y, EXIT
205	A-6762-101-A	UPPER DRUM ASS'Y, DSR-28-R
206	1-586-633-00	DETECTOR, DEW
207	3-145-535-01	SCREW, HEAD
	3-687-143-01	SCREW, HEAD CLAMP
	(NOTE: 5)	
208	3-669-317-00	SPRING, COMPRESSION
	(NOTE: 4)	
	3-564-121-00	SPRING, COMPRESSION
	(NOTE: 5)	
209	3-643-451-00	SCREW, AZIMUTH ADJUSTMENT
210	3-653-350-00	SPRING, COMPRESSION
211	3-655-631-00	TERMINAL, GROUND
212	3-675-701-00	TERMINAL BOARD
213	3-675-702-00	WASHER, INSULATING
214	3-675-708-01	SPACER, FLANGE (0.01T)
215	3-675-708-11	SPACER, FLANGE (0.03T)
216	3-675-708-21	SPACER, FLANGE (0.05T)
217	3-675-708-31	SPACER, FLANGE (0.1T)
218	3-675-711-00	PROTECTOR, DRUM
219	3-676-382-00	BRACKET, CASE
220	3-676-011-00	CASE (R), SHIELD
221	3-676-013-00	SUPPORT (A), AU HEAD
222	3-676-014-02	SUPPORT (B), AU HEAD
223	3-676-018-00	STOPPER, TENSION REGULATOR
224	3-676-077-00	BRACKET (A), A HEAD
225	3-676-078-00	BRACKET (B), A HEAD
226	3-676-079-00	ADJUSTOR, X
227	3-676-090-00	BRACKET (A), CTL HEAD
	(NOTE: 4)	
	3-687-139-01	BASE, CTL HEAD
	(NOTE: 5)	
228	3-676-091-00	BRACKET (B), CTL HEAD
	(NOTE: 4)	
	3-687-140-01	BRACKET, CTL HEAD
	(NOTE: 5)	
229	3-676-136-04	FLANGE, T.R
230	3-676-139-00	ROLLER, T.R
231	3-676-177-00	SHAFT, CG
232	3-676-206-00	FLANGE, LOWER, TR
233	3-676-207-00	SLEEVE, T ROLLER
234	3-676-208-00	PLATE, SINK
235	3-676-232-02	GUIDE, DUMMY
236	3-676-307-00	SPRING, LEAF, T.R ROLLER
237	3-703-502-01	SCREW
238	8-825-554-13	HEAD, AUDIO (RPS243-2103A)
239	8-825-554-31	HEAD, CTL (2RP244-21)
	(NOTE: 4)	
	8-825-554-82	HEAD, CTL (PS244-21B)
	(NOTE: 5)	
240	8-838-036-01	MOTOR, DC (BHF-1904A)


No.	Parts No.	Description
241	3-675-740-00	SCREW 2.6x8
242	8-825-555-50	HEAD, E (EF245-21A)
	(NOTE: 5)	
243	3-687-141-01	BRACKET, FE HEAD
	(NOTE: 5)	
244	3-687-142-01	SPACER, CTL HEAD
	(NOTE: 5)	
245	A-6736-053-A	HEAD ASS'Y, CTL

# THREADING RING, MOTOR THREADING RING, MOTOR

Threading Ring, Motor and Switch Blocks

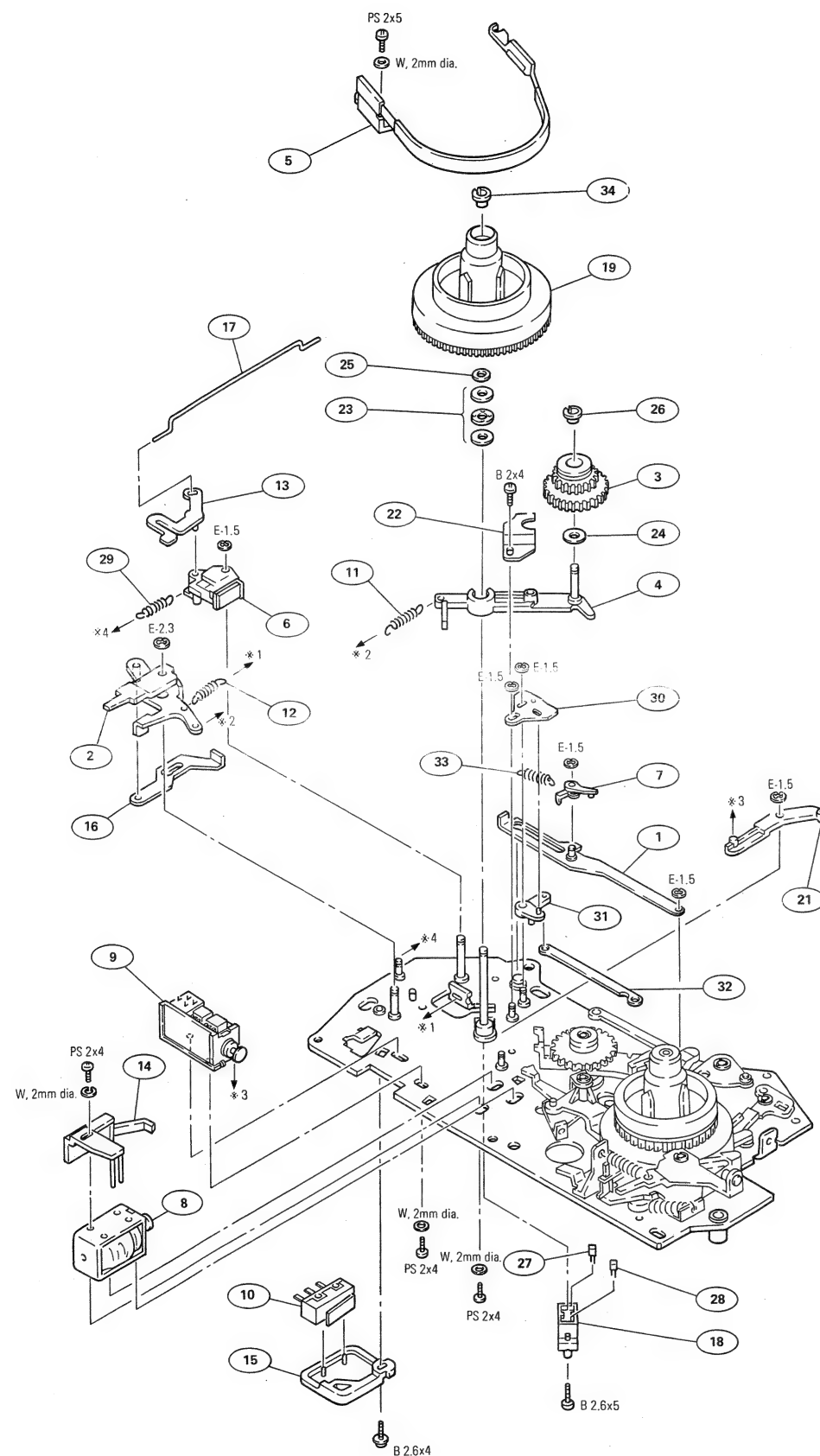


No.	Parts No.	Description
301	<b>A-6737-112-C</b>	<b>MOTOR ASS'Y, DRUM</b>
302	<b>X-3676-003-0</b>	<b>ARM ASS'Y</b>
303	X-3676-006-0	SHAFT ASS'Y, RING ROLLER
304	X-3676-007-0	PLATE ASS'Y, RG
305	X-3676-008-0	PLATE ASS'Y, ADJUSTMENT, ROLLER
306	<b>X-3676-016-0</b>	<b>ROD ASS'Y, PULL</b>
307	<b>X-3676-031-0</b>	<b>PINCH ARM ASS'Y</b>
308	<b>X-3676-055-4</b>	<b>RING SUB ASS'Y, THREADING</b>
309	<b>1-553-650-11</b>	<b>SWITCH, MICRO</b>
310	1-608-037-00	PRINTED CIRCUIT BOARD, SW-82
311	<b>3-573-964-00</b>	<b>SPRING, COMPRESSION</b>
312	<b>3-676-012-00</b>	<b>LEVER, SWITCH, UNTHREADING</b>
313	3-676-021-00	JOINT, ARM, UNTHREADING
314	3-676-034-00	STOPPER (B), RING
315	<b>3-676-178-00</b>	<b>BELT, EJ</b>
316	3-676-181-00	STOPPER (A), RING
317	3-676-301-00	PLATE, CORRECTION, SLANT GUIDE
318	<b>3-676-304-00</b>	<b>SPRING</b>
319	3-676-311-00	BASE, UNTHREADING SWITCH
320	3-676-312-02	GUIDE, PINCH ROLLER
321	<b>3-701-436-01</b>	<b>WASHER, POLY 1.6MM DIA., 0.13T</b>
322	<b>3-701-436-11</b>	<b>WASHER, POLY 1.6MM DIA., 0.25T</b>
323	<b>3-701-436-21</b>	<b>WASHER, POLY 1.6MM DIA., 0.5T</b>
324	<b>3-701-437-21</b>	<b>WASHER, POLY 2MM DIA., 0.5T</b>
325	<b>8-835-079-01</b>	<b>MOTOR, LOADING (DNR-5900A)</b>
326	<b>1-553-577-00</b>	<b>SWITCH, MICRO</b>
327	3-676-228-00	SHAFT, ARM, UNTHREADING

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# REEL CHASSIS (1) REEL CHASSIS (1)


Reel Chassis Block (1) (Left side)



BVV-1  
BVV-1N  
BVV-1PS  
BVV-1A  
BVV-1APS  
BVV-1AN  
BVV-1AN3

No.	Parts No.	Description
1	X-3676-058-0	LEVER (D) ASS'Y, T
2	X-3676-020-0	LEVER ASS'Y, REW
3	<b>X-3676-027-0</b>	<b>PULLEY ASS'Y, REW</b>
4	X-3676-045-0	ARM ASS'Y, REWIND
5	<b>X-3676-049-0</b>	<b>BAND ASS'Y, T</b>
6	<b>X-3676-056-0</b>	<b>BRAKE ASS'Y, S-SOFT</b>
7	<b>3-676-335-00</b>	<b>ARM, T</b>
8	<b>1-454-334-00</b>	<b>SOLENOID, PLUNGER</b>
9	<b>1-454-335-00</b>	<b>SOLENOID, PLUNGER</b>
10	<b>1-553-915-41</b>	<b>SWITCH, MICRO</b>
11	<b>3-140-263-XX</b>	<b>SPRING, TENSION (23T)</b>
12	<b>3-573-962-00</b>	<b>SPRING, TENSION</b>
13	<b>3-676-019-00</b>	<b>ARM, SOFT BRAKE</b>
14	3-676-027-00	STOPPER, FWD
15	3-676-097-00	BRACKET, R-SW
16	3-676-100-00	PLATE, RELEASE, REW
17	<b>3-676-165-00</b>	<b>JOINT, BRAKE, S SOFT</b>
18	<b>3-676-258-00</b>	<b>HOLDER, INTERRUPTER</b>
19	<b>3-676-261-03</b>	<b>TABLE, REEL, S</b>
21	3-676-288-00	ARM (B), BRAKE
22	3-676-290-00	PLATE, ADJUSTMENT, REWIND
23	<b>3-676-322-00</b>	<b>BEARING, THRUST</b>
24	<b>3-701-437-11</b>	<b>WASHER</b>
25	<b>3-701-439-11</b>	<b>WASHER</b>
26	<b>3-703-075-00</b>	<b>CAP 2, SHAFT</b>
27	<b>8-719-103-15</b>	<b>DIODE SE304-2K</b>
28	<b>8-729-101-13</b>	<b>TRANSISTOR PH103-2L</b>
29	<b>2-291-510-00</b>	<b>SPRING TENSION</b>
30	3-676-336-00	PLATE, T
31	3-676-337-00	ARM, T DRIVING
32	3-676-338-00	JOINT, TD
33	<b>3-491-096-11</b>	<b>SPRING, TENSION</b>
34	<b>3-703-074-00</b>	<b>CAP 3, SHAFT</b>

## NOTE:

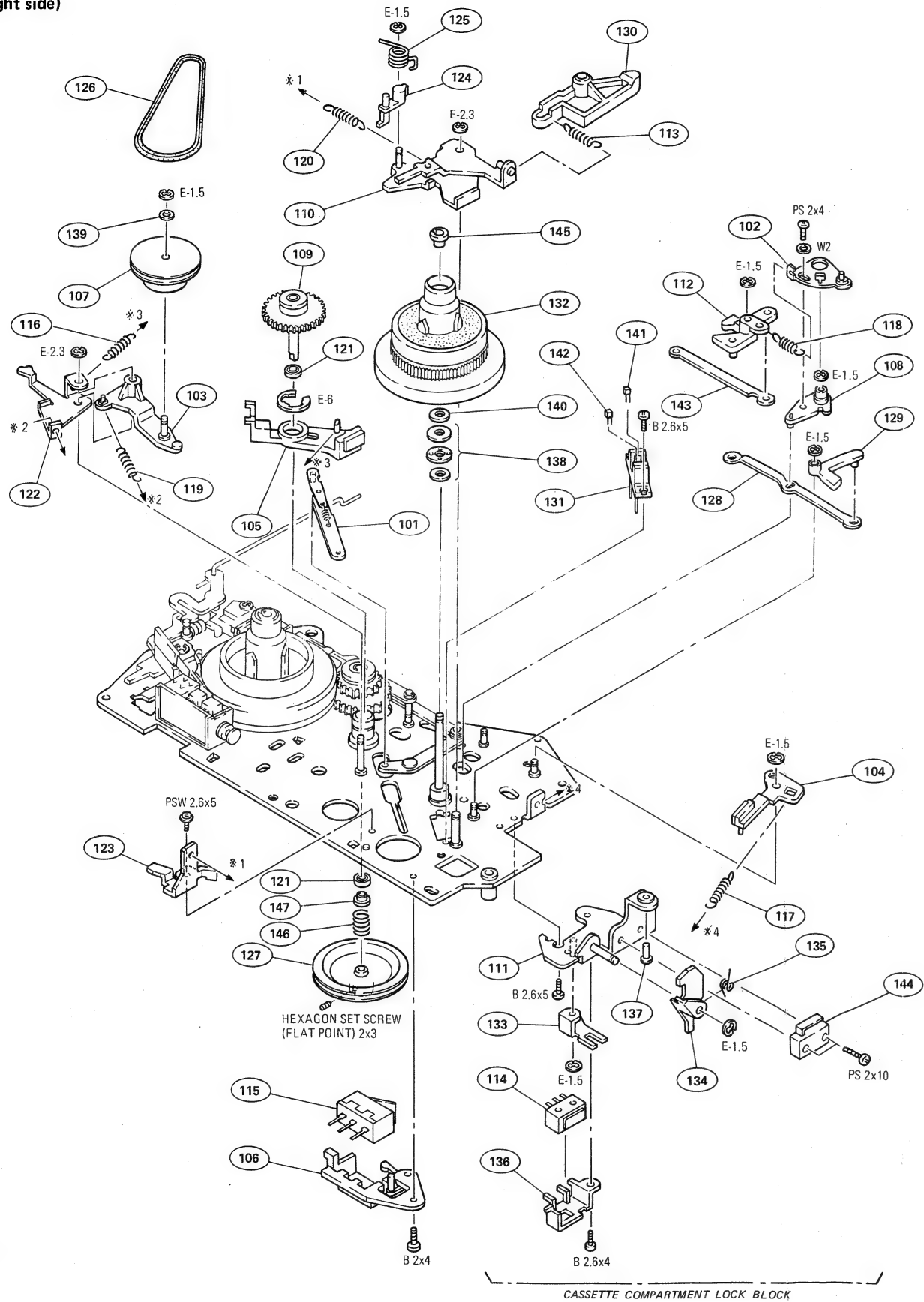
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# REEL CHASSIS (2)

# REEL CHASSIS (2)


Reel Chassis Block (2) (Right side)



BVV-1  
 BVV-1N  
 BVV-1A  
 BVV-1AN  
 BVV-1AN3

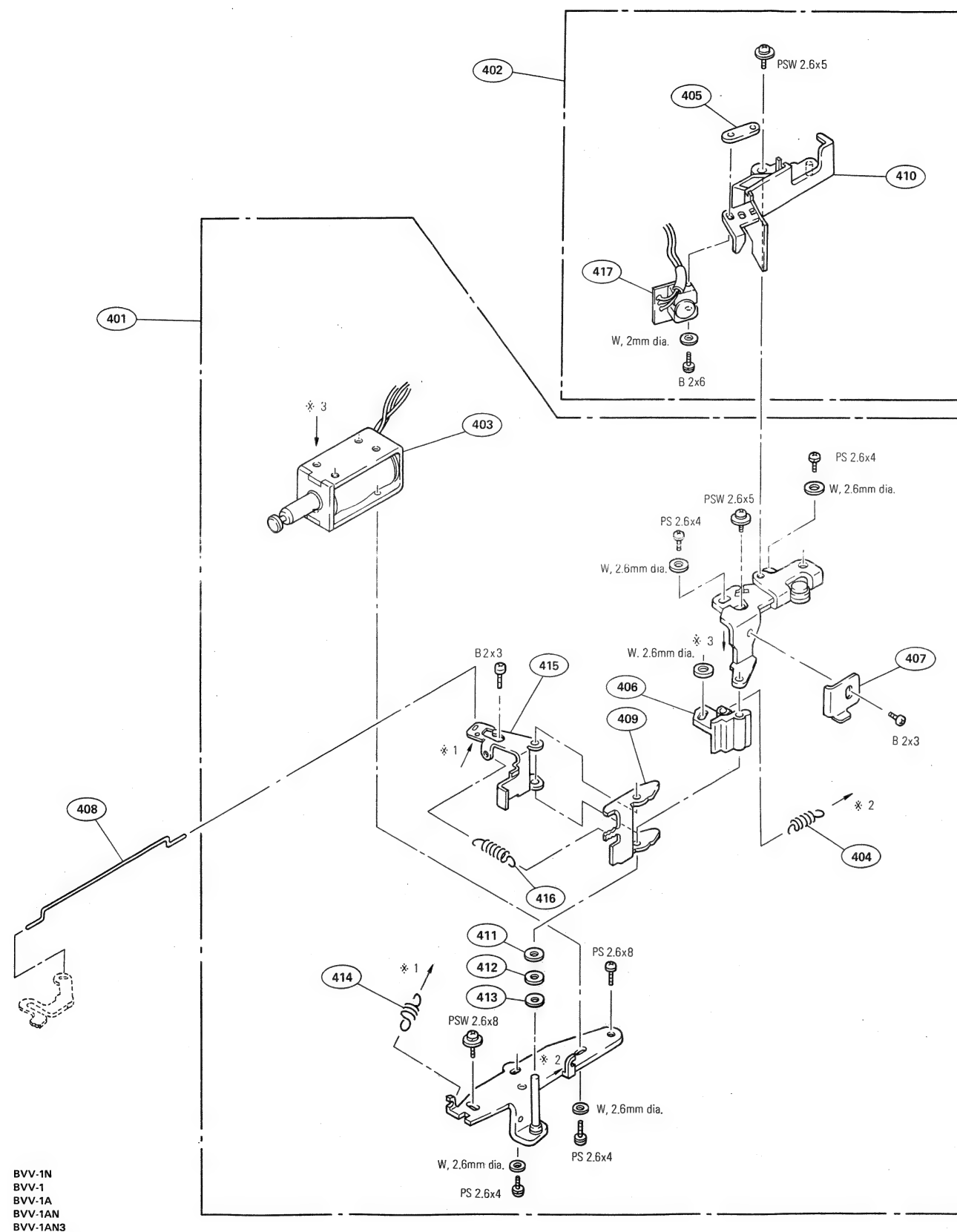
No.	Parts No.	Description
101	X-3676-060-0	LEVER (AB) ASS'Y, T
102	X-3676-004-0	PLATE ASS'Y, ADJUSTMENT, ARM
103	<b>X-3676-019-0</b>	<b>ARM ASS'Y, FWD</b>
104	<b>X-3676-021-0</b>	<b>BRAKE ASS'Y, SOFT, T</b>
105	<b>X-3676-022-2</b>	<b>BRAKE ASS'Y</b>
106	<b>X-3676-023-0</b>	<b>BRACKET ASS'Y, E-SW</b>
107	<b>X-3676-026-0</b>	<b>PULLEY ASS'Y, FWD</b>
108	X-3676-037-0	ARM ASS'Y, ST RELAY
109	<b>X-3676-040-0</b>	<b>GEAR ASS'Y, RELAY</b>
110	X-3676-041-0	LEVER ASS'Y, EJECT
111	X-3676-043-4	BRACKET ASS'Y, LOCK ARM
112	3-676-340-00	STOPPER (B), REW
113	<b>3-676-328-00</b>	<b>SPRING, TENSION</b>
114	<b>1-553-915-31</b>	<b>SWITCH, MICRO</b>
115	<b>1-553-915-41</b>	<b>SWITCH, MICRO</b>
116	<b>3-508-108-XX</b>	<b>SPRING, TENSION (17T)</b>
117	<b>3-568-321-00</b>	<b>SPRING, TENSION</b>
118	<b>3-542-475-00</b>	<b>SPRING, TENSION</b>
119	<b>3-564-107-00</b>	<b>SPRING, TENSION</b>
120	<b>3-573-962-00</b>	<b>SPRING, TENSION</b>
121	<b>3-669-443-00</b>	<b>BEARING, BALL (NO FLANGE)</b>
122	3-676-029-00	PLATE, FWD
123	3-676-101-00	RETAINER, ARM
124	3-676-102-00	ARM (A), E-SW
125	<b>3-676-105-00</b>	<b>SPRING, TENSION</b>
126	<b>3-676-175-00</b>	<b>BELT, FWD</b>
127	<b>3-676-217-02</b>	<b>PULLEY, MIDWAY</b>
128	3-676-223-00	JOINT, ER
129	<b>3-676-234-00</b>	<b>STOPPER, EJ</b>
130	<b>3-676-249-00</b>	<b>ARM, EJECT</b>
131	<b>3-676-258-00</b>	<b>HOLDER, INTERRUPTER</b>
132	<b>X-3676-074-0</b>	<b>TABLE, REEL, T</b>
133	3-676-272-02	LEVER, LOCK SWITCH
134	<b>3-676-273-00</b>	<b>ARM, LOCK, CASSETTE COMPARTMENT</b>
135	3-676-274-00	SPRING
136	3-676-275-00	HOLDER, M-SW
137	3-676-277-00	SHAFT, CASSETTE-IN
138	<b>3-676-322-00</b>	<b>BEARING, THRUST</b>
139	<b>3-701-437-11</b>	<b>WASHER, POLY 2MM DIA., 0.25T</b>
140	<b>3-701-439-11</b>	<b>WASHER, POLY 3MM DIA., 0.25T</b>
141	<b>8-719-103-15</b>	<b>DIODE SE304-2K</b>
142	<b>8-729-101-13</b>	<b>TRANSISTOR PH103-2L</b>
143	3-676-338-00	JOINT, TD
144	<b>1-553-650-11</b>	<b>SWITCH, MICRO</b>
145	<b>3-703-074-00</b>	<b>CAP 3, SHAFT</b>
146	<b>3-637-331-00</b>	<b>SPRING, COMPRESSION</b>
147	<b>3-676-385-00</b>	<b>RETAINER, BEARING</b>

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# PINCH PRESS MECHANISM

Pinch Press Mechanism Block



No.	Parts No.	Description
401	<b>A-6749-076-E</b>	<b>PRESS ASS'Y, PINCH</b>
402	<b>A-6765-043-A</b>	<b>END SENSOR ASS'Y</b>
403	<b>1-454-340-00</b>	<b>SOLENOID, PLUNGER</b>
404	<b>3-639-181-00</b>	<b>SPRING, TENSION</b>
405	3-646-476-00	NUT, PLATE
406	3-676-094-04	STOPPER, TAPE
407	3-676-095-00	RETAINER, ARM
408	<b>3-676-165-00</b>	<b>JOINT, BRAKE, S SOFT</b>
409	3-676-246-00	LEVER (A), PINCH PRESS
410	3-676-250-00	BRACKET, END SENSOR
411	<b>3-701-437-01</b>	<b>WASHER, POLY 2MM DIA., 0.13T</b>
412	<b>3-701-437-11</b>	<b>WASHER, POLY 2MM DIA., 0.25T</b>
413	<b>3-701-437-21</b>	<b>WASHER, POLY 2MM DIA., 0.5T</b>
414	<b>3-567-110-00</b>	<b>SPRING, TENSION</b>
415	3-676-263-03	LEVER (B), PINCH PRESS
416	<b>3-678-774-00</b>	<b>SPRING, TENSION</b>
417	<b>1-464-267-00</b>	<b>SENSOR, T COIL</b>

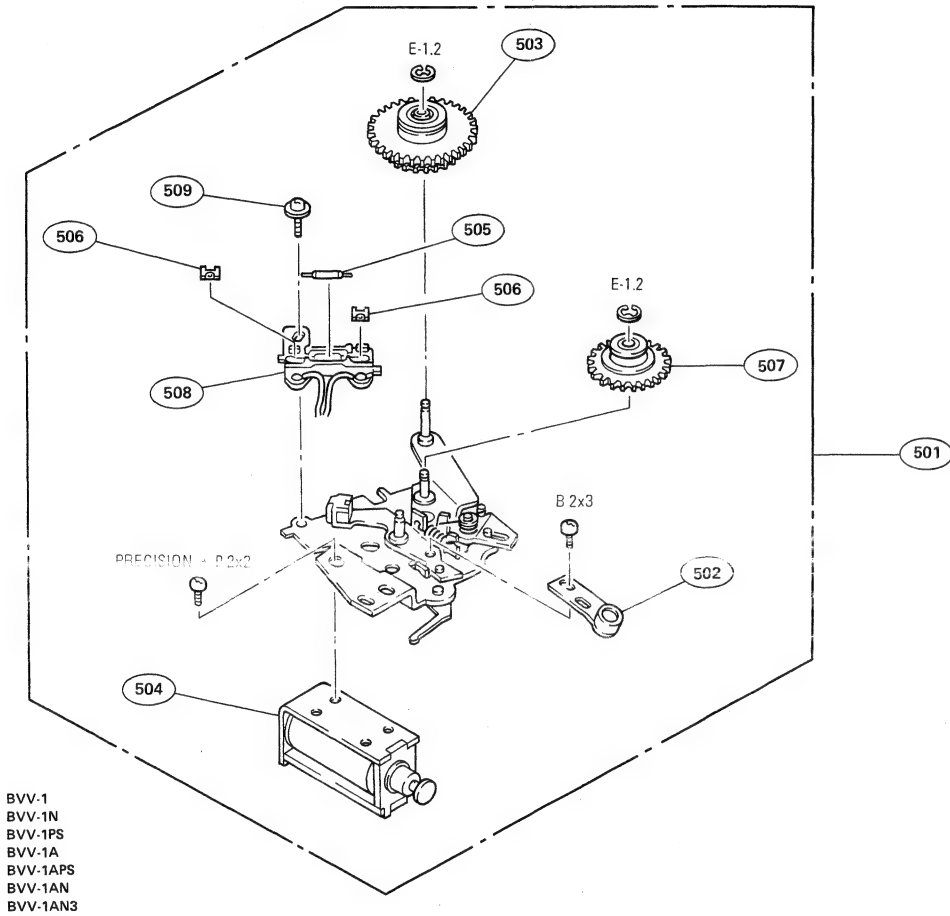
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RING STOPPER ASS'Y

GEAR ASS'Y

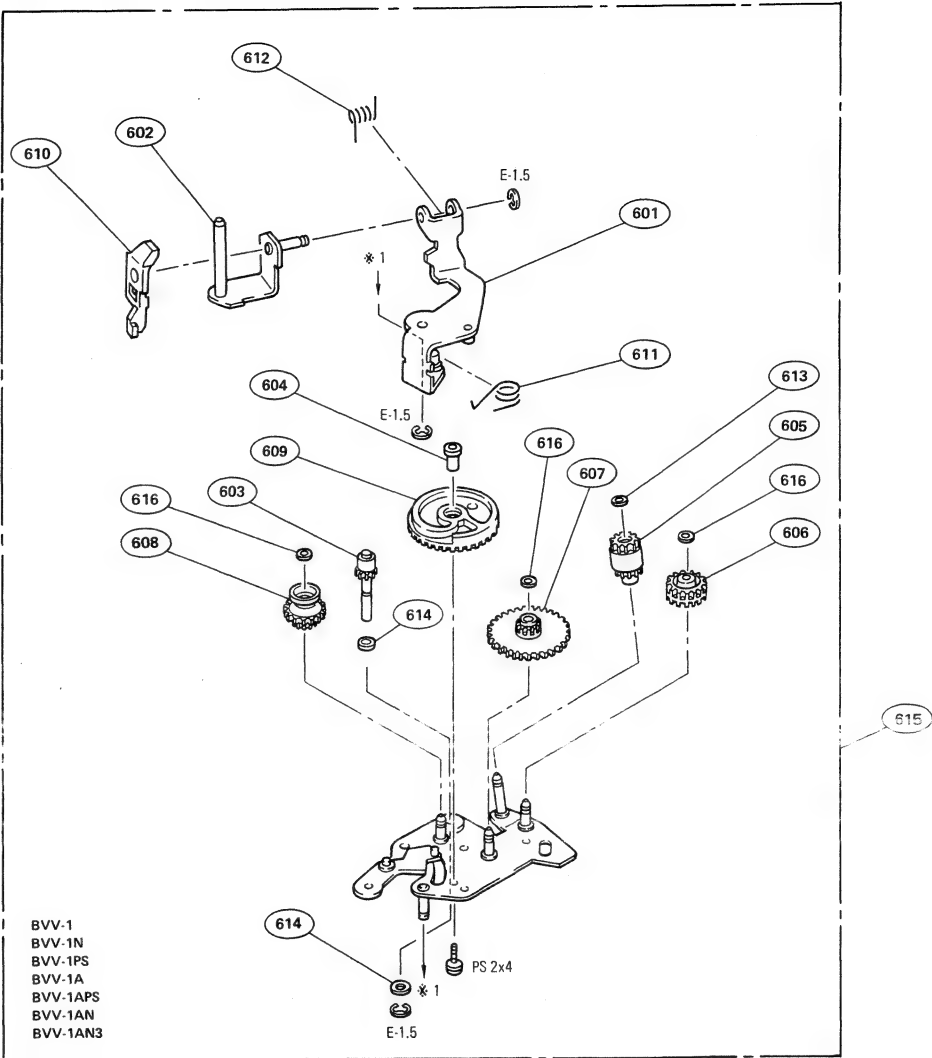
Ring Stopper Assembly Block



No.	Parts No.	Description
501	A-6747-223-A	STOPPER ASS'Y, RING
502	X-3676-029-0	ARM (B) ASS'Y, STOPPER
503	X-3676-044-0	IDLER ASS'Y, EJECT
504	1-454-335-00	SOLENOID, PLUNGER
505	1-570-816-11	SWITCH, REED
506	3-676-062-00	TERMINAL, SWITCH
507	3-676-163-00	PULLEY, EJ RELAY
508	3-676-255-00	HOLDER, SWITCH
509	3-703-502-22	SCREW

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Gear Assembly Block



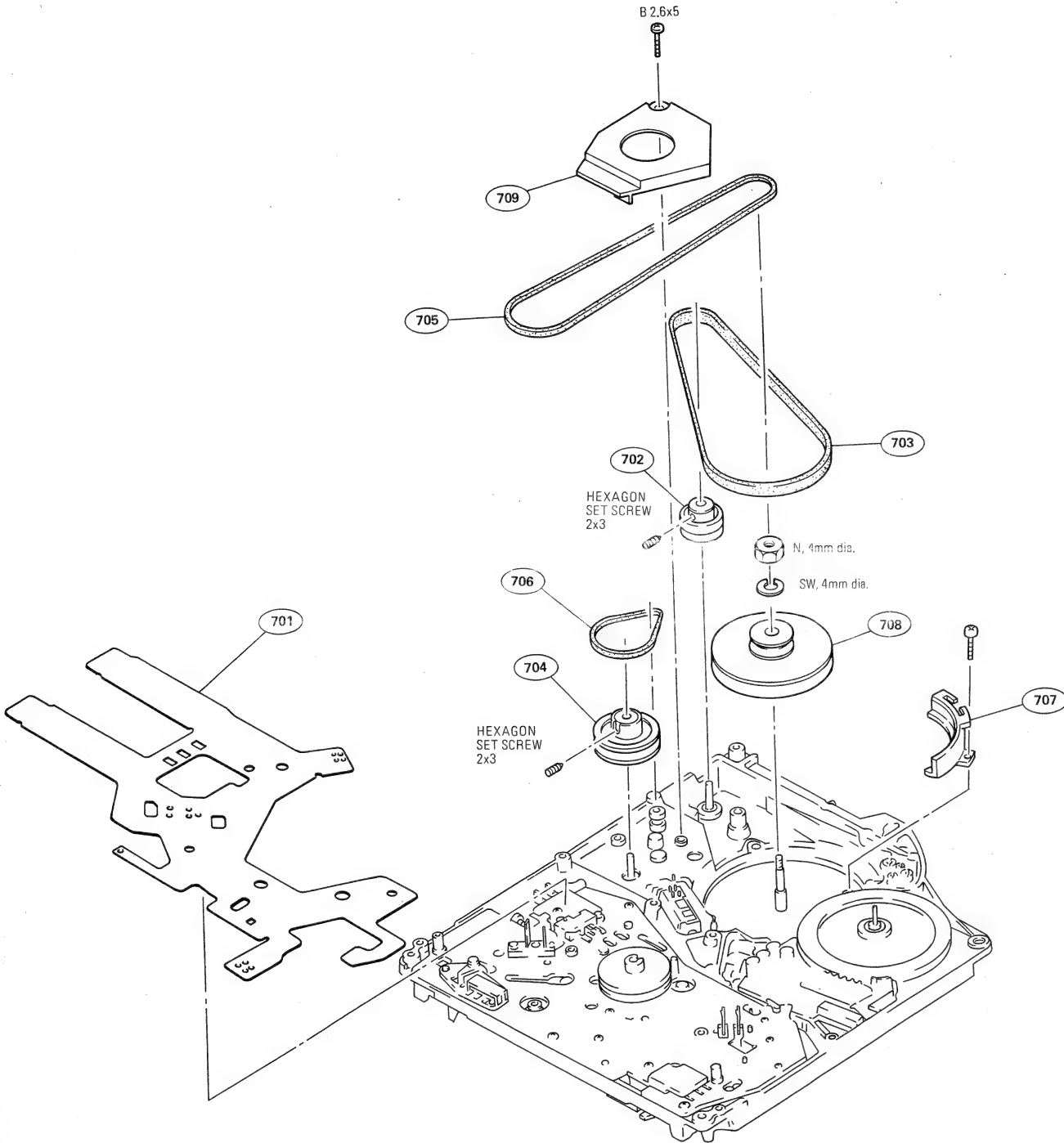
No.	Parts No.	Description
601	X-3676-038-2	ARM ASS'Y, PULL
602	X-3676-039-0	LINK ASS'Y, SLANT
603	X-3676-050-0	GEAR ASS'Y, MOTHER
604	3-676-133-00	SHAFT, CAM
605	3-676-156-00	GEAR, RING DRIVE
606	3-676-157-00	GEAR, TRANSFER
607	3-676-160-00	GEAR, DECELERATION
608	3-676-167-00	PULLEY, EJECT
609	3-676-260-00	CAM, DRAWER
610	3-676-306-04	TRAVELER, TAPE
611	3-676-308-00	SPRING
612	3-676-309-03	SPRING
613	3-701-436-11	WASHER, POLY 1.6MM DIA., 0.25T
614	3-701-437-11	WASHER, POLY 2MM DIA., 0.25T
615	A-6750-138-F	GEAR BLOCK ASS'Y
616	3-676-387-00	WASHER, POLY, 1.6MM DIA.

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REEL CHASSIS (3) REEL CHASSIS (3)

Reel Chassis Block (3) (Back side)

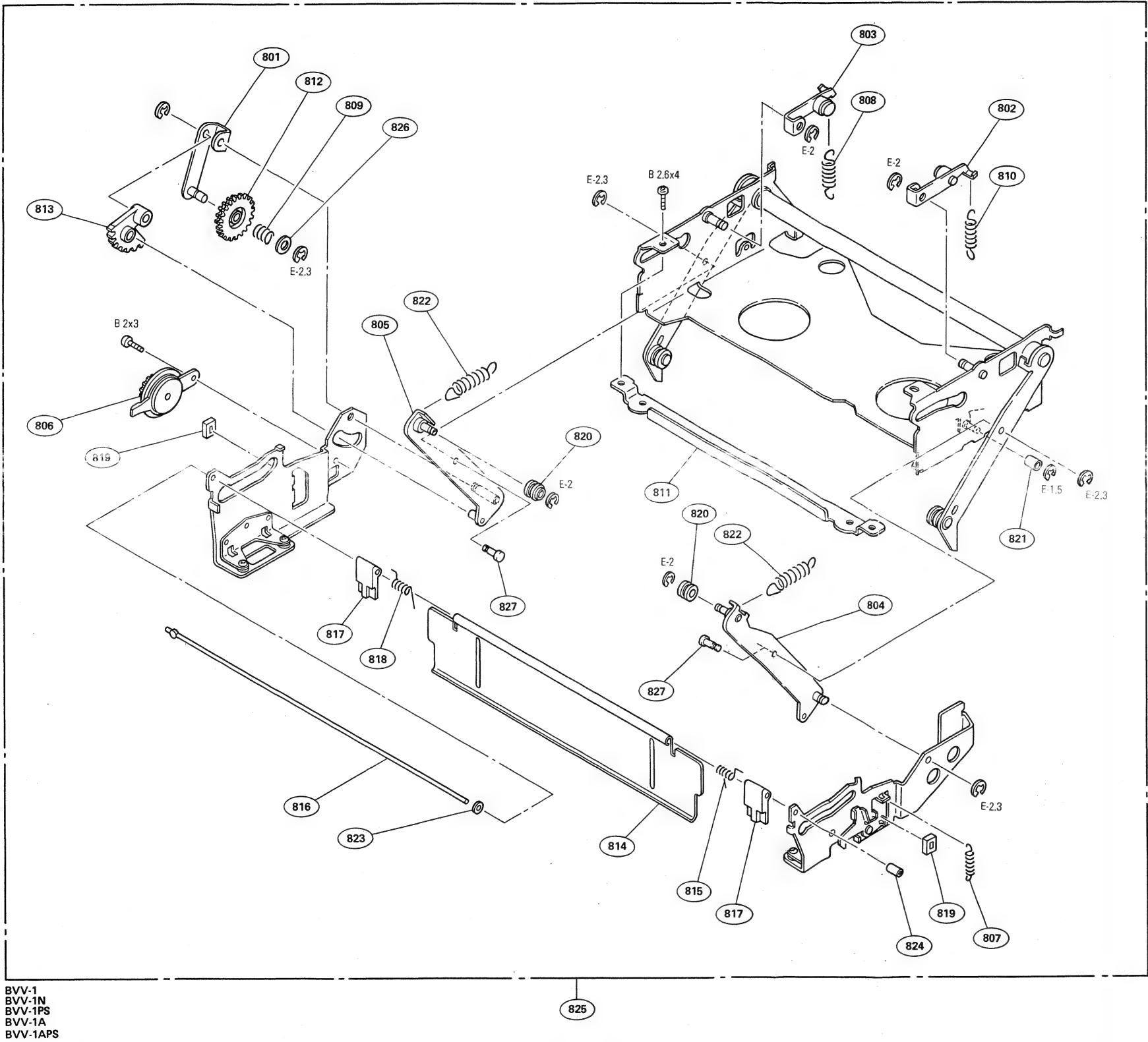
BVV-1  
BVV-1N  
BVV-1PS  
BVV-1A  
BVV-1APS  
BVV-1AN  
BVV-1AN3



No.	Parts No.	Description
701	1-608-028-00	PRINTED CIRCUIT BOARD, FL-7
702	3-676-035-00	PULLEY, D MOTOR
703	3-676-059-00	BELT, DRUM
704	3-676-166-00	PULLEY, DECELERATION
705	3-676-176-00	BELT, MECHANICAL
706	3-676-303-00	BELT, T.H MOTOR
707	3-675-716-00	GUARD, DRUM
708	3-675-703-00	PULLEY, DRUM
709	3-676-381-00	COVER, T PULLEY


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Cassette-up Compartment Block



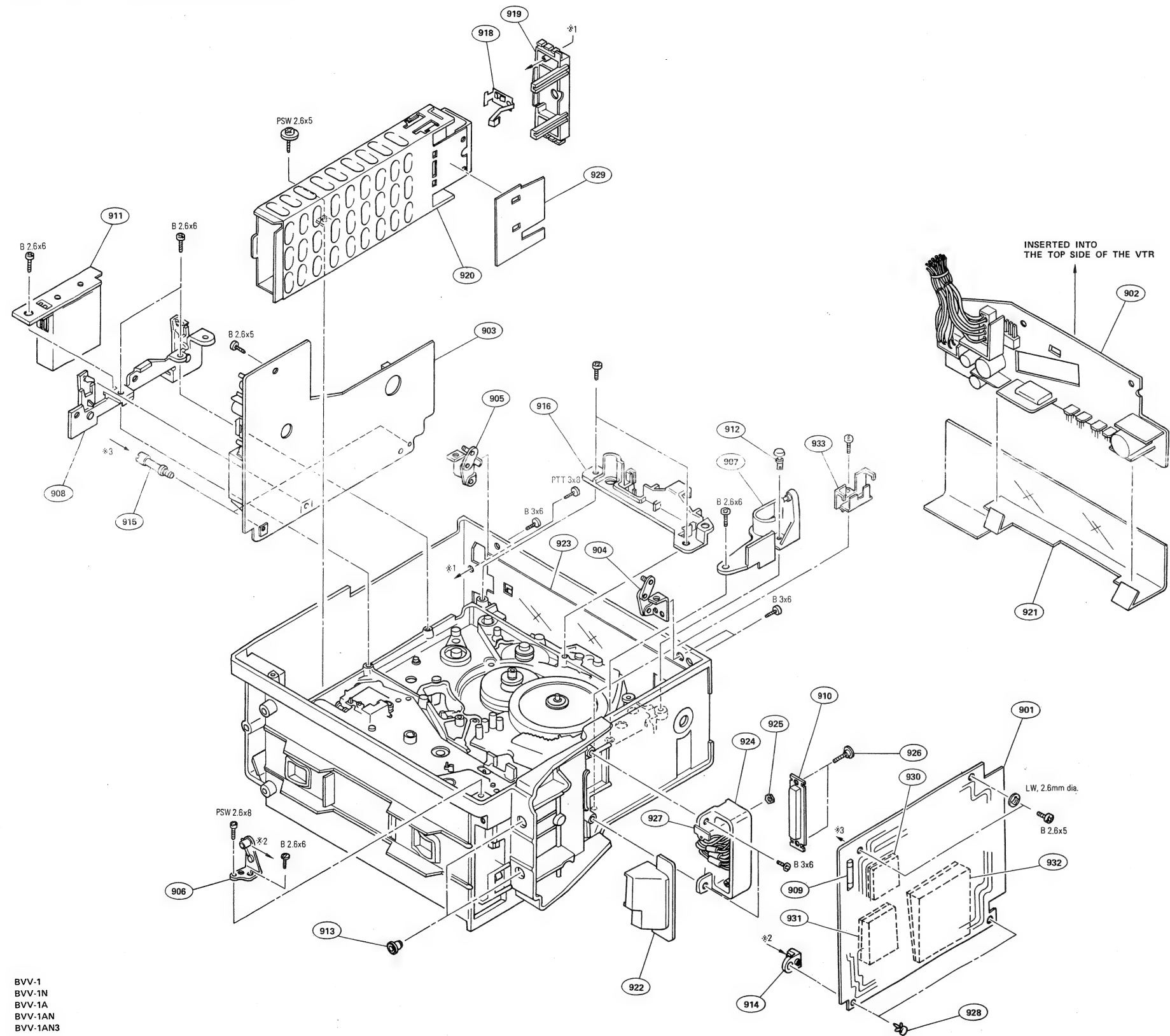
BVV-1  
BVV-1N  
BVV-1PS  
BVV-1A  
BVV-1APS

No.	Parts No.	Description
801	X-3676-001-0	LEVER SUB ASS'Y, GEAR
802	X-3676-009-0	LEVER (RIGHT) ASS'Y, RETAINER
803	X-3676-010-0	LEVER (LEFT) ASS'Y, RETAINER
804	X-3676-013-0	ARM (A) (RIGHT) SUB ASS'Y
		UC: S/N 10490 AND LOWER
		J: S/N 10255 AND LOWER
	X-3676-013-2	UC: S/N 40001 AND HIGHER
		J: S/N 10256 AND HIGHER
805	X-3676-014-0	ARM (A) (LEFT) SUB ASS'Y
		UC: S/N 10490 AND LOWER
		J: S/N 10255 AND LOWER
	X-3676-014-2	UC: S/N 40001 AND HIGHER
		J: S/N 10256 AND HIGHER
806	<b>X-3676-024-2</b>	<b>DAMPER ASS'Y</b>
807	3-542-475-00	SPRING, TENSION
808	<b>3-567-029-00</b>	<b>SPRING, TENSION</b>
809	<b>3-567-100-00</b>	<b>SPRING, COMPRESSION</b>
810	<b>3-670-169-00</b>	<b>SPRING, TENSION</b>
811	3-676-049-00	STAY, CASSETTE COMPARTMENT
812	<b>3-676-054-00</b>	<b>GEAR, SPEED</b>
813	<b>3-676-055-00</b>	<b>LEVER, SPEED</b>
814	3-676-064-00	SHUTTER
815	3-676-065-00	SPRING, TORSION
816	3-676-067-00	SHAFT, SHUTTER
817	3-676-068-00	GUIDE, CASSETTE
818	3-676-069-00	SPRING, TORSION
819	3-676-143-00	STOPPER, ARM
820	<b>3-676-154-00</b>	<b>ROLLER</b>
821	<b>3-676-221-03</b>	<b>ROLLER, LOCK</b>
822	3-678-787-00	SPRING, TENSION
823	<b>3-701-436-11</b>	<b>WASHER, POLY 1.6MM DIA., 0.25T</b>
824	<b>4-866-397-00</b>	<b>CUSHION, LED</b>
825	<b>A-6751-150-G</b>	<b>CASSETTE COMPARTMENT ASS'Y</b>
826	3-663-748-00	WASHER, SUS
827	3-676-148-03	SHAFT, ARM, CASSETTE COMPARTMENT

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BATTERY CASE, P.C.B. BATTERY CASE, P.C.B.

Battery Case and P.C.B. (Printed Circuit Board) Blocks



BVV-1  
BVV-1N  
BVV-1A  
BVV-1AN  
BVV-1AN3

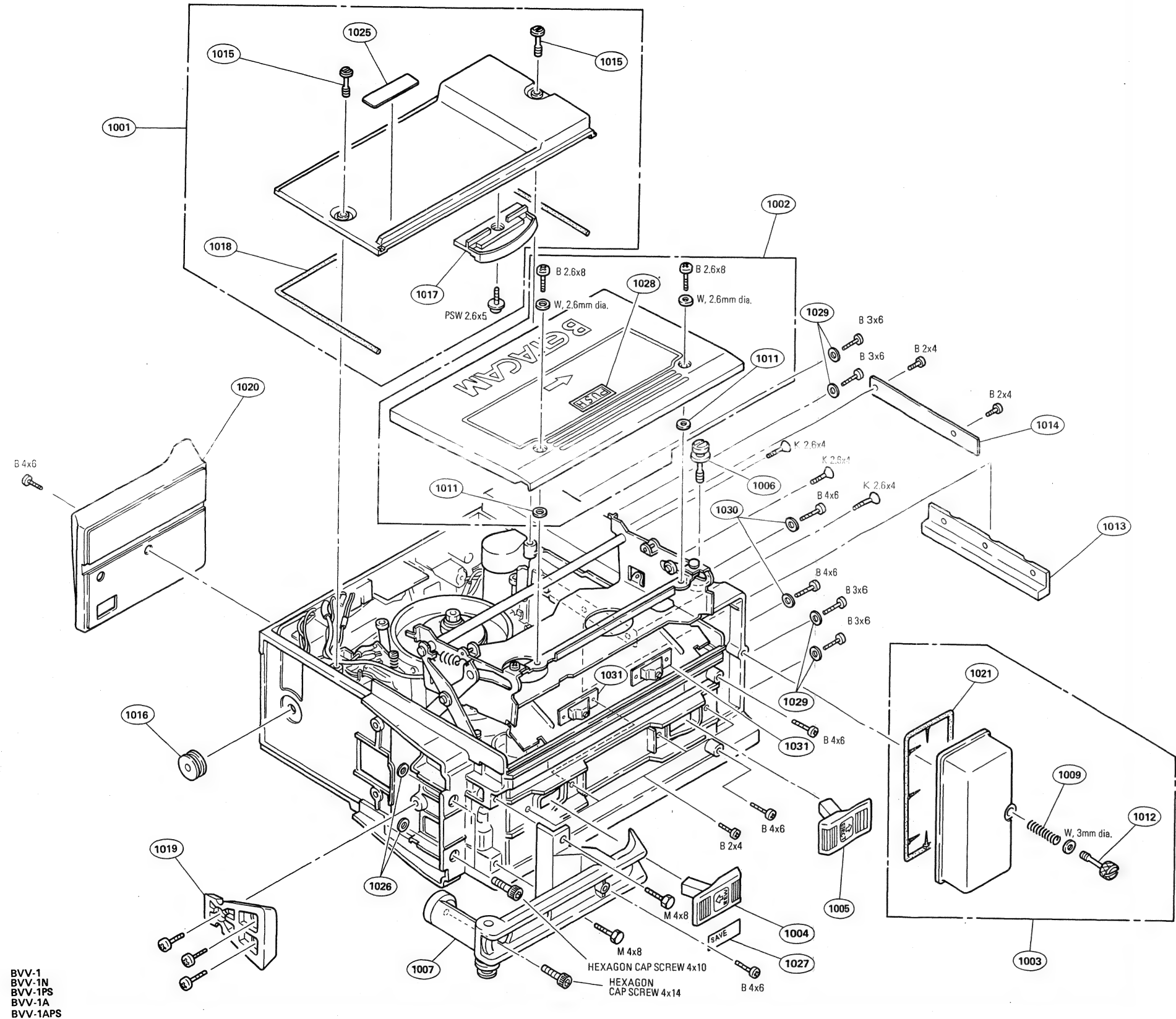
No.	Parts No.	Description
901	A-6759-115-A	MOUNTED CIRCUIT BOARD, VA-16
902	A-6715-169-C	MOUNTED CIRCUIT BOARD, TR-15
903	A-6717-299-A	MOUNTED CIRCUIT BOARD, SS-23
904	X-3676-017-0	HINGE (LEFT) ASS'Y
905	X-3676-018-0	HINGE (RIGHT) ASS'Y
906	X-3676-046-2	HOLDER (A) ASS'Y, PC BOARD
907	X-3676-047-0	HOLDER (C) ASS'Y, PC BOARD
908	X-3676-048-0	HOLDER (E) ASS'Y, PC BOARD
909	1-548-119-00	HOURS METER
910	1-562-083-00	HOUSING, CONNECTOR 50P
911	1-608-036-00	PRINTED CIRCUIT BOARD, BA-3
912	3-531-576-31	RIVET (DIA. 3), NYLON
913	3-676-082-00	WASHER, SCREW
914	3-676-295-00	HINGE, VA
915	3-676-298-00	SHAFT, VA GUIDE
916	3-676-299-00	HOLDER (D), PC BOARD
918	3-676-314-00	CONTACT
919	3-676-315-00	HOLDER, BATTERY CASE
920	3-676-316-03	CASE, BATTERY
921	3-676-348-02	SHEET, INSULATING (TR)
922	3-676-352-00	CAP, C HOLDER
923	3-676-353-02	SHEET, INSULATING
924	3-676-365-00	HOLDER, V CONNECTOR
925	3-676-369-00	NUT, SPACER
926	3-676-370-00	PIN, CN HOLDER
927	3-676-371-00	NUT, S
928	4-812-134-11	RIVET NYLON 3.5
929	3-678-736-00	COVER, BATTERY
930	3-678-742-00	LID (A), VA CASE
931	3-678-744-00	LID (B), VA CASE
933	3-676-384-00	CLAMP, HARNESS

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ORNAMENTAL PANEL

ORNAMENTAL PANEL

Ornamental Panel Block



BVV-1  
BVV-1N  
BVV-1PS  
BVV-1A  
BVV-1APS

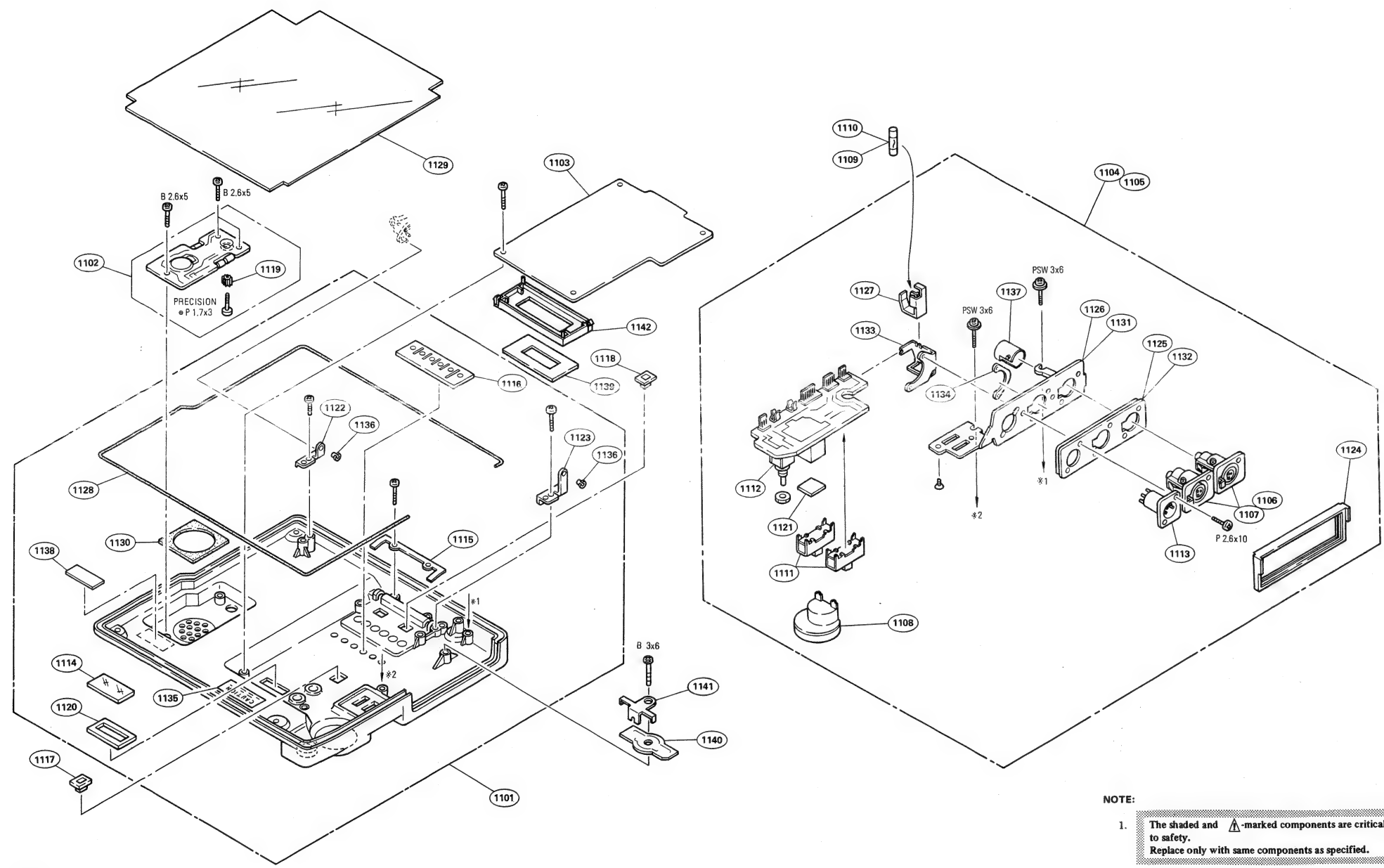
No.	Parts No.	Description
1001	A-6703-257-F	LID ASS'Y, CONTROL
1002	A-6703-259-E	LID ASS'Y, UPPER
1003	A-6703-260-A	LID ASS'Y, BATTERY CASE
1004	X-3676-061-2	KNOB ASS'Y, REWIND
1005	X-3676-062-2	KNOB ASS'Y, ELECT
1006	X-3676-063-0	SUSPENSION ASS'Y (S)
1007	X-3676-094-1	HANDLE ASS'Y
1009	3-646-377-00	SPRING
1011	3-669-595-00	WASHER (2), STOPPER
1012	3-676-005-00	SCREW, LID, BATTERY CASE
1013	3-676-060-00	CABINET (MAIN-VS)
1014	3-676-073-00	LABEL (CN)
1015	3-676-089-03	SCREW, LID
1016	3-676-125-00	PIN, STOPPER
1017	3-676-332-05	GUARD, TAPE
1018	3-676-339-11	RUBBER
1019	3-676-349-00	SHOE, V
1020	3-676-350-00	PAD (V), SHOULDER
1021	3-676-363-00	RUBBER, LID, BATTERY
1025	3-703-081-31	LABEL, CAUTION
1026	3-687-116-01	WASHER, STOP, 4
1027	3-678-748-00	LABEL, CAUTION, REW
1028	3-649-268-11	LABEL, PUSH CASSETTE CONTROL
1029	3-701-439-21	WASHER, POLY. 3MM DIA., 0.5T
1030	3-701-441-21	WASHER, POLY. 4MM DIA., 0.5T
1031	3-687-134-01	LEVER, SHIELD

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  - Item with no part number and/or no description are not stocked because they are seldom required for routine service.




SIDE PANEL (1) SIDE PANEL (1)

Side Panel Block (1)



BVV-1  
BVV-1A

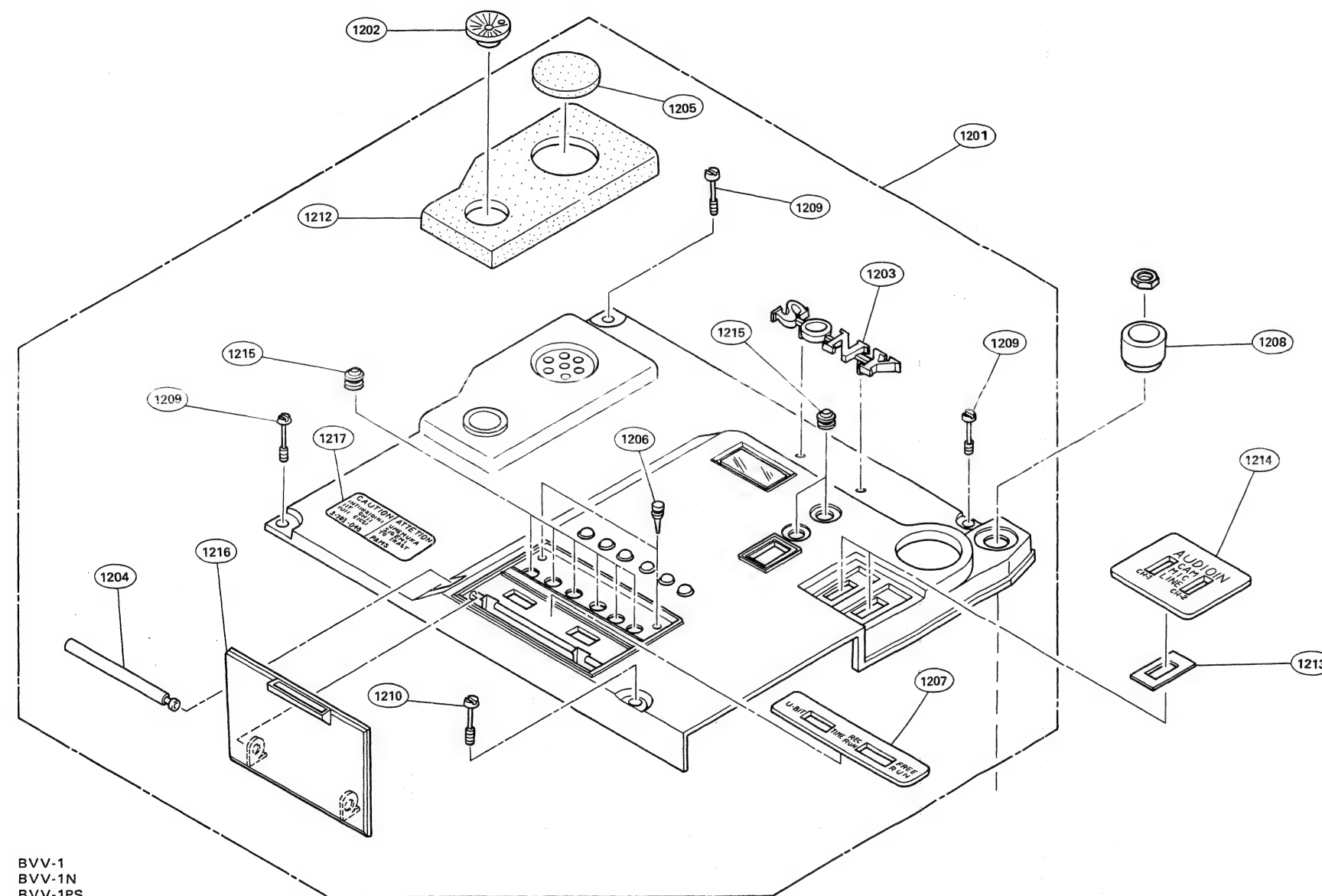
No.	Parts No.	Description
1101	<b>A-6703-254-D</b>	<b>PANEL SUB ASS'Y, SIDE</b>
1102	A-6713-142-B	MOUNTED CIRCUIT BOARD, SP-10
1103	A-6717-369-B	MOUNTED CIRCUIT BOARD, TC-33
1104	A-6717-286-B	MOUNTED CIRCUIT BOARD, CP-49 (FOR U/C)
1105	A-6717-287-B	MOUNTED CIRCUIT BOARD, CP-49 (FOR J)
1106	<b>1-509-176-41</b>	<b>RECEPTACLE, XLR (FOR J)</b>
1107	<b>1-509-184-51</b>	<b>RECEPTACLE, XLR (FOR U/C)</b>
1108	<b>1-520-433-00</b>	<b>METER, LEVEL</b>
1109	<b>1-532-594-00</b>	<b>FUSE, GLASS TUBE (FOR J)</b>
1110	<b>1-532-656-00</b>	<b>FUSE, GLASS TUBE (FOR U/C)</b>
1111	<b>1-552-574-21</b>	<b>SWITCH, SLIDE</b>
1112	<b>1-553-448-00</b>	<b>SWITCH, TOGGLE</b>
1113	<b>1-560-999-11</b>	<b>RECEPTACLE, XLR, 4P</b>
1114	3-662-710-00	COVER, COUNTER
1115	3-676-071-00	SPRING
1116	3-675-075-03	COVER, LED
1117	<b>3-676-076-00</b>	<b>KNOB (A), SWITCH</b>
1118	<b>3-676-083-00</b>	<b>KNOB (B), SWITCH</b>
1119	3-676-088-00	SHAFT, KNOB
1120	3-676-106-00	FILM, COUNTER COVER
1121	3-676-107-00	CUSHION, METER
1122	3-676-235-03	ARM (A), HINGE
1123	3-676-236-03	ARM (B), HINGE
1124	3-676-239-00	PAD, CN HOLDER
1125	3-676-242-00	SPACER, XLR (FOR U/C)
1126	3-676-254-00	HOLDER, CONNECTOR (FOR U/C)
1127	3-676-325-00	HOLDER, RESERVE FUSE
1128	<b>3-676-339-11</b>	<b>RUBBER</b>
1129	3-676-351-00	SHEET, INSULATING
1130	3-676-354-00	CUSHION, SPEAKER
1131	3-676-358-00	HOLDER, CONNECTOR (FOR J)
1132	3-676-359-00	SPACER, XLR (FOR J)
1133	3-676-367-00	BRACKET, DC CONNECTOR
1134	3-676-380-00	NUT, PLATE, XLR (FOR J)
1135	3-703-044-26	LABEL, CAUTION
1136	<b>3-703-074-00</b>	<b>CAP 3, SHAFT</b>
1137	X-3676-066-0	CASE ASS'Y, XLR SHIELD (FOR U/C)
	X-3676-067-0	CASE ASS'Y, XLR SHIELD (FOR J)
1138	3-678-782-00	LABEL, DOLBY (C)
1139	3-678-785-00	COVER, DUST, COUNTER
1140	1-613-381-11	PRINTED CIRCUIT BOARD, DUS-34
1141	3-687-108-11	PLATE, D HOLDER
1142	3-687-144-01	COVER, LCD UC: S/N 40324 AND HIGHER J: S/N 10476 AND HIGHER

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# SIDE PANEL (2) SIDE PANEL (2)


Side Panel Block (2)



BVV-1  
BVV-1N  
BVV-1PS  
BVV-1A  
BVV-1APS

No.	Parts No.	Description
1201	<b>A-6703-254-D</b>	<b>PANEL SUB ASS'Y, SIDE</b>
1202	<b>X-3676-028-2</b>	<b>KNOB ASS'Y, CONTROL</b>
1203	3-675-901-00	EMBLEM, SONY
1204	3-676-072-00	SHAFT, TC LID
1205	<b>3-676-080-00</b>	<b>PAD (B), EAR</b>
1206	3-676-081-02	CUSHION, TC
1207	3-676-084-00	LABEL (TC)
1208	3-676-086-00	GUARD, SWITCH
1209	<b>3-676-089-03</b>	<b>SCREW, LID</b>
1210	<b>3-676-089-13</b>	<b>SCREW, LID</b>
1212	<b>3-676-238-00</b>	<b>PAD (A), EAR</b>
1213	3-676-240-00	PLATE, BLIND, SWITCH
1214	3-676-241-00	LABEL (AU)
1215	<b>3-676-244-11</b>	<b>COVER, SWITCH</b>
1216	3-676-376-00	LID, TC
1217	3-703-043-21	LABEL, CAUTION, MAIN

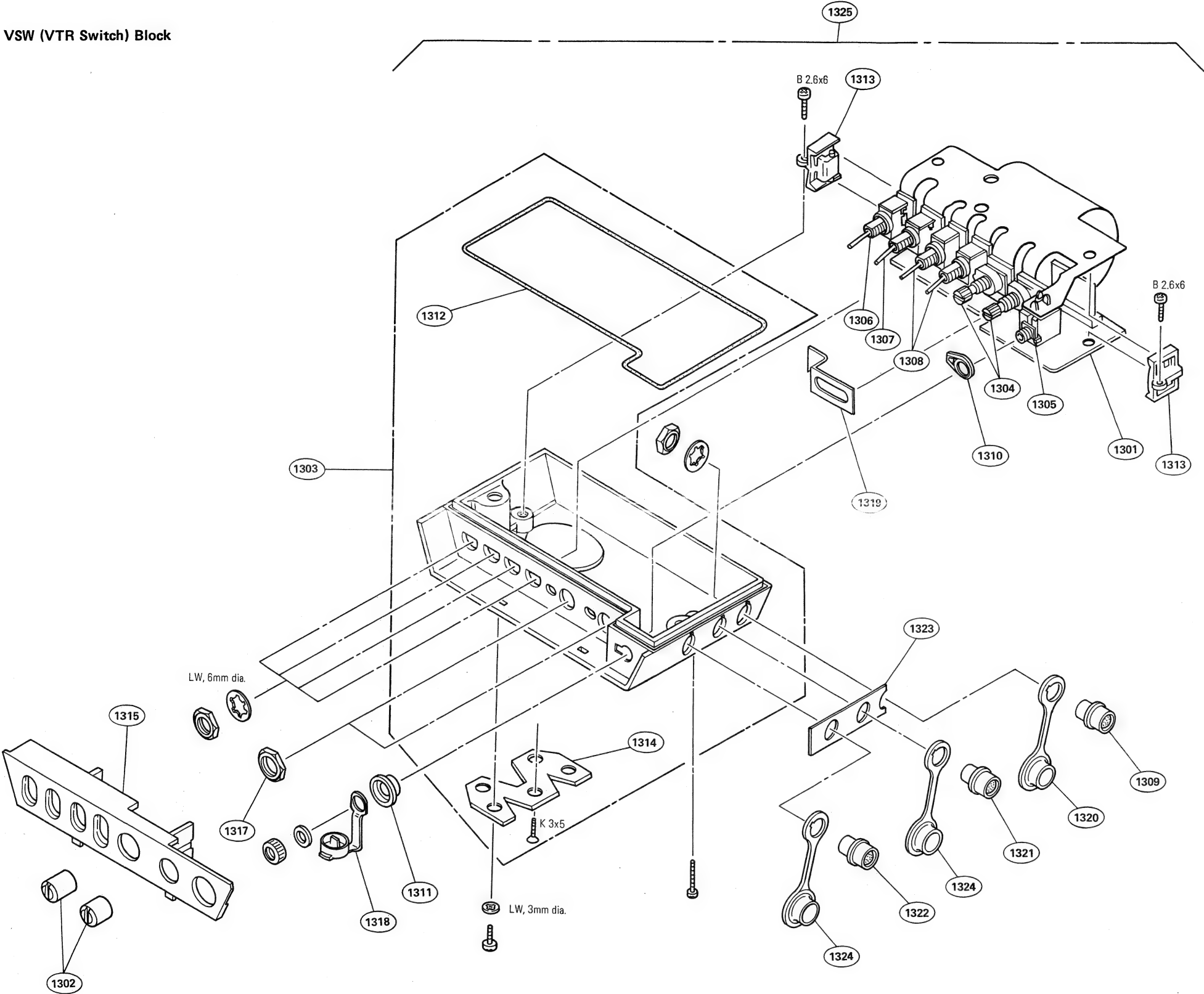
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- Item with no part number and/or no description are not stocked because they are seldom required for routine service.

# VSW BLOCK


# VSW BLOCK

## VSW (VTR Switch) Block



BVV-1A  
BVV-1APS  
BVV-1AN  
BVV-1AN3

No.	Parts No.	Description
1301	A-6713-204-A	MOUNTED CIRCUIT BOARD, LC-6
<b>1302</b>	<b>X-3664-208-0</b>	<b>KNOB ASS'Y, FADE</b>
<b>1303</b>	<b>X-3676-095-1</b>	<b>HOLDER SUB ASS'Y, VSW</b>
<b>1304</b>	<b>1-226-677-00</b>	<b>RES, VAR, CARBON 20K</b>
<b>1305</b>	<b>1-507-251-XX</b>	<b>JACK</b>
<b>1306</b>	<b>1-554-355-00</b>	<b>SWITCH, TOGGLE</b>
<b>1307</b>	<b>1-554-356-00</b>	<b>SWITCH, TOGGLE</b>
<b>1308</b>	<b>1-554-882-11</b>	<b>SWITCH, TOGGLE</b>
<b>1309</b>	<b>1-562-086-00</b>	<b>CONNECTOR (ROUND TYPE) 5P</b>
<b>1310</b>	<b>3-437-228-00</b>	<b>INSULATOR, JACK</b>
<b>1311</b>	<b>3-437-229-01</b>	<b>INSULATOR (B), JACK</b>
<b>1312</b>	<b>3-676-339-11</b>	<b>RUBBER</b>
1313	3-676-341-00	GUIDE, LC
1314	3-676-344-00	STOPPER, M
1315	3-678-798-01	ESCUTCHEON, VSW
<b>1317</b>	<b>3-703-078-01</b>	<b>NUT</b>
<b>1318</b>	<b>3-849-405-00</b>	<b>COVER, EARPHONE JACK</b>
1319	X-3676-069-0	SHIELD ASS'Y AUDIO
<b>1320</b>	<b>3-678-769-00</b>	<b>CAP</b>
<b>1321</b>	<b>1-562-642-11</b>	<b>CONNECTOR, (R-F)</b>
<b>1322</b>	<b>1-564-689-11</b>	<b>CONNECTOR, (R-M)</b>
1323	3-687-112-01	PANEL, TC CONNECTOR
<b>1324</b>	<b>3-687-113-01</b>	<b>CAP (A)</b>
1325	A-6730-784-A	HOLDER ASS'Y, VSW (FOR PS)

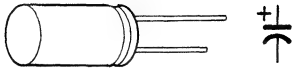
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  - Parts printed in **Bold-Face** type are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in **Bold-Face** type will be processed, but allow for additional delivery time.
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16-3. ELECTRICAL PARTS LIST

Parts that are not listed in the "reference numbers order list" are shown in following table.  
Reference numbers are omitted.

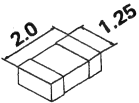
ELECTROLYTIC CAPACITOR

0.47μF through 470μF  
6.3WV through 50 (63, 100)WV



Parts No. 1-123-□□□-00					
Value	Parts No. -□□□-	Value	Parts No. -□□□-	Value	Parts No. -□□□-
0.47μF 50V		22μF 35V	342	100μF 50V	360
100	379	50		220 6.3	
1 50		63	371	10	308
100	380	33 6.3		16	321
2.2 50		10		25	334
100	381	16	318	35	346
3.3 25		25		50	361
35		35	343	330 6.3	
50		50		10	309
100	382	63	372	16	322
4.7 25		47 6.3		25	335
35		10	306	35	347
50		16		50	362
63	369	25	332	470 6.3	298
10 10		35		10	310
16		50	359	16	323
25		100 6.3		25	336
35		10	307	35	348
50	356	16		50	
22 16		25	333	63	377
25	330	35	345		

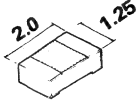
CHIP CERAMIC CAPACITOR



220pF through 0.018μF(B) ± 10% 50WV  
0.022μF through 0.068μF(F) <sup>+80</sup>/<sub>-20</sub> % 50WV  
0.1μF (F) <sup>+80</sup>/<sub>-20</sub> % 25WV

Parts No. 1-163-□□□-00					
Value	Parts No. -□□□-	Value	Parts No. -□□□-	Value	Parts No. -□□□-
100pF	—	0.001μF	009	0.01μF	021
120	—	0.0012	010	0.012	022
150	—	0.0015	011	0.015	023
180	—	0.0018	012	0.018	024
220	001	0.0022	013	0.022	033
270	002	0.0027	014	0.027	—
330	003	0.0033	015	0.033	034
390	004	0.0039	016	0.039	—
470	005	0.0047	017	0.047	035
560	006	0.0056	018	0.056	—
680	007	0.0068	019	0.068	036
820	008	0.0082	020	0.082	—
				0.1	038

CHIP RESISTOR

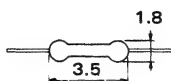
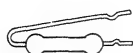


±5% 1/10W  
2.2Ω through 3.3MΩ

Parts No. 1-216-□□□-00											
Value	Parts No. -□□□-	Value	Parts No. -□□□-	Value	Parts No. -□□□-	Value	Parts No. -□□□-	Value	Parts No. -□□□-	Value	Parts No. -□□□-
1Ω	—	33Ω	013	1kΩ	049	33kΩ	085	1MΩ	121		
1.1	—	36	014	1.1	050	36	086	1.1	122		
1.2	—	39	015	1.2	051	39	087	1.2	123		
1.3	—	43	016	1.3	052	43	088	1.3	124		
1.5	—	47	017	1.5	053	47	089	1.5	125		
1.6	—	51	018	1.6	054	51	090	1.6	126		
1.8	—	56	019	1.8	055	56	091	1.8	127		
2	—	62	020	2	056	62	092	2	128		
2.2	298	68	021	2.2	057	68	093	2.2	129		
2.4	301	75	022	2.4	058	75	094	2.4	130		
2.7	302	82	023	2.7	059	82	095	2.7	131		
3	303	91	024	3	060	91	096	3	132		
3.3	304	100Ω	025	3.3	061	100kΩ	097	3.3	133		
3.6	305	110	026	3.6	062	110	098				
3.9	306	120	027	3.9	063	120	099				
4.3	307	130	028	4.3	064	130	100				
4.7	308	150	029	4.7	065	150	101				
5.1	297	160	030	5.1	066	160	102				
5.6	309	180	031	5.6	067	180	103				
6.2	310	200	032	6.2	068	200	104				
6.8	311	220	033	6.8	069	220	105				
7.5	312	240	034	7.5	070	240kΩ	106				
8.2	313	270	035	8.2	071	270	107				
9.1	314	300	036	9.1	072	300	108				
10Ω	001	330	037	10kΩ	073	330	109				
11	002	360	038	11	074	360	110				
12	003	390	039	12	075	390	111				
13	004	430	040	13	076	430	112				
15	005	470	041	15	077	470	113				
16	006	510	042	16	078	510	114				
18	007	560	043	18	079	560	115				
20	008	620	044	20	080	620	116				
22	009	680	045	22	081	680	117				
24	010	750	046	24	082	750	118				
27	011	820	047	27	083	820	119				
30	012	910	048	30	084	910	120				

# CARBON RESISTOR (1/6W)

±5%, 1/6W, non-special type  
2.2Ω through 1MΩ

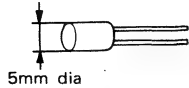


Parts No. 1-247-□□□-00

Value	Parts No. -□□□-	Value	Parts No. -□□□-	Value	Parts No. -□□□-	Value	Parts No. -□□□-
1Ω	—	36Ω	796	1.2kΩ	833	43kΩ	870
1.1	—	39	797	1.3	834	47	871
1.2	—	43	798	1.5	835	51	872
1.3	—	47	799	1.6	836	56	873
1.5	—	51	800	1.8	837	62	874
1.6	—	56	801	2	838	68	875
1.8	—	62	802	2.2	839	75	876
2	—	68	803	2.4	840	82	877
2.2	767	75	804	2.7	841	91	878
2.4	768	82	805	3	842	100kΩ	879
2.7	769	91	806	3.3	843	110	880
3	770	100Ω	807	3.6	844	120	881
3.3	771	110	808	3.9	845	130	882
3.6	772	120	809	4.3	846	150	883
3.9	773	130	810	4.7	847	160	884
4.3	774	150	811	5.1	848	180	885
4.7	775	160	812	5.6	849	200	886
5.1	776	180	813	6.2	850	220	887
5.6	777	200	814	6.8	851	240	888
6.2	778	220	815	7.5	852	270	889
6.8	779	240	816	8.2	853	300	890
7.5	780	270	817	9.1	854	330	891
8.2	781	300	818	10kΩ	855	360	892
9.1	782	330	819	11	856	390	893
10Ω	783	360	820	12	857	430	894
11	784	390	821	13	858	470	895
12	785	430	822	15	859	510	896
13	786	470	823	16	860	560	897
15	787	510	824	18	861	620	898
16	788	560	825	20	862	680	899
18	789	620	826	22	863	750	900
20	790	680	827	24	864	820	901
22	791	750	828	27	865	910	902
24	792	820	829	30	866	1MΩ	903
27	793	910	830	33	867		
30	794	1kΩ	831	36	868		
33	795	1.1	832	39	869		

# MICRO INDUCTOR

1  $\mu$ H through 470  $\mu$ H  
 $\pm 5\%$

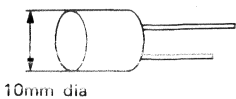


Parts No. 1-407- $\square\square\square$ -XX

Value	Parts No. - $\square\square\square$ -	Value	Parts No. - $\square\square\square$ -	Value	Parts No. - $\square\square\square$ -	Value	Parts No. - $\square\square\square$ -
1 $\mu$ H	178	4.7 $\mu$ H	186	22 $\mu$ H	161	100 $\mu$ H	169
1.2	179	5.6	187	27	162	120	170
1.5	180	6.8	188	33	163	150	171
1.8	181	8.2	189	39	164	180	172
2.2	182	10	157	47	165	220	173
2.7	183	12	158	56	166	270	174
3.3	184	15	159	68	167	330	175
3.9	185	18	160	82	168	390	176
						470	177

# MICRO INDUCTOR

470  $\mu$ H through 33 mH  
 $\pm 5\%$

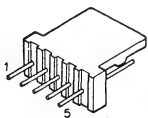


Parts No. 1-407- $\square\square\square$ -00

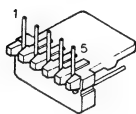
Value	Parts No. - $\square\square\square$ -	Value	Parts No. - $\square\square\square$ -	Value	Parts No. - $\square\square\square$ -	Value	Parts No. - $\square\square\square$ -
470 $\mu$ H	488	1.5 mH	494	4.7 mH	500	15 mH	506
560	489	1.8	495	5.6	501	18	507
680	490	2.2	496	6.8	502	22	508
820	491	2.7	497	8.2	503	27	509
1 mH	492	3.3	498	10	504	33	510
1.2	493	3.9	499	12	505		

# CONNECTOR

top-type receptacle

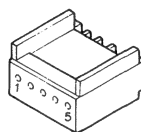


side-type receptacle



plug

housing



contact



2P	1-560-456-00
3P	1-560-466-00
4P	1-560-467-00
5P	1-560-468-00
6P	1-560-469-00
7P	1-560-591-00
8P	1-560-470-00
10P	1-560-471-00
12P	1-560-472-00
14P	1-560-652-00

2P	1-560-455-00
3P	1-560-459-00
4P	1-560-460-00
5P	1-560-461-00
6P	1-560-462-00
7P	1-560-922-00
8P	1-560-463-00
10P	1-560-464-00
12P	1-560-465-00
13P	1-560-923-00

2P	1-561-581-00
3P	1-561-584-00
4P	1-561-585-00
5P	1-561-586-00
6P	1-561-587-00
7P	1-561-689-00
8P	1-561-588-00
10P	1-561-589-00
12P	1-561-590-00
13P	1-562-065-00
14P	1-561-750-00

1-561-557-00

## ABBREVIATIONS

Ref. No.	Description	Ref. No.	Description	Ref. No.	Description
C□□, CV□□	CAPACITOR	H□□	HEAD	R□□, RV□□	RESISTOR
CN□□	CONNECTOR	IC□□	IC	S□□, SW□□	SWITCH
D□□	DIODE	J□□	JACK	T□□	TRANSFORMER
DL□□	DELAY LINE	L□□	INDUCTOR	TH□□	THERMISTOR
F□□	FUSE	M□□	MOTOR	X□□	CRYSTAL
FB□□	FERRITE BEAD	PM□□	SOLENOID		
FL□□	FILTER	Q□□	TRANSISTOR		

All capacitors are in micro farads unless otherwise specified.

All inductors are in micro henries unless otherwise specified.

All resistors are in ohms.

Ref.No. Parts No. SP Description

### BA-3 BOARD

1-608-036-00 o PRINTED CIRCUIT BOARD, BA-3

C1 1-125-309-00 s DOUBLE LAYERS 0.33F +5.5V

R1 1-214-531-00 s METAL 82 1% 1/8W

### CP-49 BOARD

△ A-6717-286-B o MOUNTED CIRCUIT BOARD, CP-49 (UC)

△ A-6717-287-B o MOUNTED CIRCUIT BOARD, CP-49 (J)

1-533-037-XX s HOLDER, FUSE

D1 8-719-101-69 s RD8.2E-L1

D2 8-719-815-55 s 1S1555

D3 8-719-815-55 s 1S1555

△ F1 1-532-656-00 s 6.3A (UC)

△ F1 1-532-594-00 s 6.3A (J)

IC1 8-741-106-60 s BX1066 (SONY)

ME1 1-520-433-00 s "BATT/AUDIO"

RV1 1-228-475-00 s VAR, CERMET 20K

S1 1-552-574-21 s SLIDE "CH-1"

S2 1-552-574-21 s SLIDE "CH-2"

T1 1-429-067-00 s MICROPHONE

T2 1-429-067-00 s MICROPHONE

Ref.No. Parts No. SP Description

### DUS-34 BOARD

1-613-381-11 o PRINTED CIRCUIT BOARD, DUS-34

CN1 1-508-901-00 o 3P

1-509-984-00 o HOUSING

1-509-982-00 o CONTACT

D1 8-719-908-00 s ESAC33-02CS

# LC-6, SP-10, SS-23

Ref.No. Parts No. SP Description

## LC-6 BOARD

A-6713-204-A o MOUNTED CIRCUIT BOARD, LC-6

C9 1-163-259-00 s CERAMIC CHIP 220PF 5% 50V  
C19 1-163-259-00 s CERAMIC CHIP 220PF 5% 50V  
C24 1-131-376-00 s TANTALUM 6.8 10% 10V  
C25 1-131-376-00 s TANTALUM 6.8 10% 10V

D1 8-719-101-23 s 1SS123  
D2 8-719-101-23 s 1SS123

IC1 8-759-745-60 s NJM4560D(JRC)  
IC2 8-759-240-53 s TC4053BP(TOSHIBA)  
IC3 8-759-745-60 s NJM4560D(JRC)

J1 1-507-251-XX s "EARPHONE"

PH1 1-806-876-11 s MCD-521L

Q1 8-729-100-66 s 2SC1623  
Q2 8-729-663-47 s 2SC1364  
Q3 8-729-663-47 s 2SC1364  
Q4 8-729-663-47 s 2SC1364  
Q5 8-729-100-66 s 2SC1623

Q6 8-729-663-47 s 2SC1364  
Q7 8-729-663-47 s 2SC1364  
Q8 8-729-663-47 s 2SC1364

R1 1-247-791-00 s CARBON 22 5% 1/6W  
R7 1-247-791-00 s CARBON 22 5% 1/6W

RV1 1-226-677-00 s VAR,CARBON 20K  
"AUDIO LEVEL CH-1"  
RV2 1-226-677-00 s VAR,CARBON 20K  
"AUDIO LEVEL CH-2"  
RV3 1-228-461-00 s VAR,CERMET 50K  
RV4 1-228-461-00 s VAR,CERMET 50K  
RV5 1-228-459-00 s VAR,CERMET 10K

S1 1-554-355-00 s LEVER ROCKER "METER SELECT"  
S2 1-554-356-00 s LEVER ROCKER "CH SELECT"  
S3 1-554-882-00 s LEVER ROCKER "AUDIO MANU/AUTO"  
S4 1-554-882-00 s LEVER ROCKER "AUDIO MANU/AUTO"

TH1 1-800-195-00 s S-250

## SP-10 BOARD

A-6713-142-B o MOUNTED CIRCUIT BOARD, SP-10

C1 1-131-344-00 s TANTALUM 0.33 10% 35V  
C2 1-123-827-00 s EJECT 220 20% 4V  
C3 1-161-475-00 s CERAMIC 0.033 10% 50V  
C4 1-161-475-00 s CERAMIC 0.033 10% 50V

Ref.No. Parts No. SP Description

D1 8-719-160-03 s RD2.2FC

IC1 8-751-840-00 s CX184(SONY)

RV1 1-230-337-11 s VAR,CARBON 10K "VOLUME"

SP1 1-503-059-00 s SPEAKER 4 OHM 0.1W

## SS-23 BOARD S/NO.10031 - 10090

A-6717-299-A o MOUNTED CIRCUIT BOARD, SS-23

C1 1-130-484-00 s FILM 0.012 5% 50V  
C4 1-131-341-00 s TANTALUM 0.1 10% 35V  
C5 1-131-404-00 s TANTALUM 0.22 20% 35V  
C6 1-131-404-00 s TANTALUM 0.22 20% 35V  
C7 1-131-404-00 s TANTALUM 0.22 20% 35V

C10 1-130-484-00 s FILM 0.012 5% 50V  
C11 1-131-404-00 s TANTALUM 0.22 20% 35V  
C13 1-131-404-00 s TANTALUM 0.22 20% 35V  
C15 1-131-404-00 s TANTALUM 0.22 20% 35V  
C17 1-130-483-00 s FILM 0.01 5% 50V

C21 1-131-404-00 s TANTALUM 0.22 20% 35V  
C23 1-131-379-00 s TANTALUM 22 10% 10V  
C27 1-124-313-00 s ELECT 100 20% 16V  
C29 1-124-313-00 s ELECT 100 20% 16V  
C32 1-163-227-00 s CERAMIC CHIP 10PF 5% 50V

C35 1-130-483-00 s FILM 0.01 5% 50V  
C39 1-124-313-00 s ELECT 100 20% 16V  
C104 1-131-350-00 s TANTALUM 3.3 10% 35V  
C105 1-163-235-00 s CERAMIC CHIP 22PF 5% 50V  
C106 1-163-235-00 s CERAMIC CHIP 22PF 5% 50V

C115 1-130-489-00 s FILM 0.033 5% 50V  
C116 1-131-344-00 s TANTALUM 0.33 10% 35V  
C118 1-123-566-00 s ELECT 2200 20% 16V  
C121 1-131-347-00 s TANTALUM 1.0 10% 35V  
C122 1-163-239-00 s CERAMIC CHIP 33PF 5% 50V  
C130 1-131-381-00 s TANTALUM 47 10% 10V

CN102 1-562-046-00 o 12P  
CN104 1-562-046-00 o 12P

D1 8-719-101-23 s 1SS123  
D2 8-719-100-05 s 1S2837  
D3 8-719-100-03 s 1S2835  
D4 8-719-100-03 s 1S2835  
D5 8-719-100-03 s 1S2835

D6 8-719-100-05 s 1S2837  
D7 8-719-100-05 s 1S2837  
D101 8-719-100-05 s 1S2837  
D102 8-719-100-05 s 1S2837  
D103 8-719-100-03 s 1S2835

D106 8-719-200-02 s 10E-2  
D107 8-719-200-02 s 10E-2  
D108 8-719-100-03 s 1S2835  
D109 8-719-100-03 s 1S2835

Ref.No. Parts No. SP Description

IC1 8-751-941-03 s CX194B(SONY)  
 IC2 8-749-911-55 s BX1155(SONY)  
 IC3 8-759-729-03 s NJM2903D(JRC)  
 IC4 8-759-345-38 s HD14538BP(HITACHI)  
 IC101 8-757-850-00 s CX785(SONY)

IC102 8-759-101-14 s uPD8243C(NEC)  
 IC103 8-759-245-12 s TC4512BP(TOSHIBA)  
 IC104 8-759-245-12 s TC4512BP(TOSHIBA)  
 IC105 8-759-345-38 s HD14538BP(HITACHI)  
 IC106 8-759-240-20 s TC4020BP(TOSHIBA)

IC107 8-759-240-69 s TC4069UBP(TOSHIBA)  
 IC108 8-759-200-59 s TD62703P(TOSHIBA)  
 IC109 8-759-200-59 s TD62703P(TOSHIBA)  
 IC110 8-741-119-60 s BX1196(SONY)  
 IC111 8-741-107-10 s BX1071(SONY)

IC112 1-464-241-00 s DC LEVEL SENSOR  
 IC113 8-759-759-82 s ROM,MM27C32

L1 1-408-654-00 s MICRO 1mH  
 L2 1-408-298-00 s 2mH

PW101 1-464-226-00 s DC-DC CONVERTER

Q1 8-729-612-22 s 2SA1162  
 Q2 8-729-100-66 s 2SC1623  
 Q3 8-729-100-66 s 2SC1623  
 Q4 8-729-100-66 s 2SC1623  
 Q5 8-729-100-66 s 2SC1623

Q6 8-729-100-66 s 2SC1623  
 Q7 8-729-100-66 s 2SC1623  
 Q101 8-729-100-66 s 2SC1623  
 Q102 8-729-100-66 s 2SC1623  
 Q103 8-729-100-66 s 2SC1623

Q104 8-729-100-66 s 2SC1623  
 Q105 8-729-100-66 s 2SC1623  
 Q107 8-729-100-76 s 2SA812  
 Q108 8-729-100-76 s 2SA812  
 Q109 8-729-100-76 s 2SA812

Q110 8-729-100-76 s 2SA812  
 Q111 8-729-100-66 s 2SC1623  
 Q112 8-729-100-66 s 2SC1623  
 Q113 8-729-100-66 s 2SC1623  
 Q114 8-729-100-66 s 2SC1623

R37 1-214-591-00 s METAL 27K 1% 1/8W  
 R38 1-214-590-00 s METAL 24K 1% 1/8W  
 R193 1-210-832-00 s CARBON 6.8M 5% 1/4W  
 R194 1-214-587-00 s METAL 18K 1% 1/8W  
 R237 1-214-576-00 s METAL 6.2K 1% 1/8W  
 R238 1-210-829-00 s CARBON 5.1M 5% 1/4W

RV1 1-228-461-00 s VAR,CERMET 50K  
 RV3 1-228-463-00 s VAR,CERMET 200K  
 RV4 1-228-461-00 s VAR,CERMET 50K  
 RV5 1-228-460-00 s VAR,CERMET 20K  
 RV6 1-228-459-00 s VAR,CERMET 10K

RV7 1-228-461-00 s VAR,CERMET 50K  
 RV101 1-228-458-00 s VAR,CERMET 5K  
 RV102 1-228-464-00 s VAR,CERMET 500K

Ref.No. Parts No. SP Description

X101 1-567-064-00 s 34.4KHz  
 X102 1-567-068-00 s 3.58MHz

SS-23 BOARD S/N.10091 AND LATER (UC)  
 S/N.10011 AND LATER (J)

A-6717-299-A o MOUNTED CIRCUIT BOARD,SS-23  
 WITH DUS-40 BOARD

1-614-110-11 o PRINTED CIRCUIT BOARD,DUS-40

C1 1-130-484-00 s FILM 0.012 5% 50V  
 C4 1-131-341-00 s TANTALUM 0.1 10% 35V  
 C5 1-131-404-00 s TANTALUM 0.22 20% 35V  
 C6 1-131-404-00 s TANTALUM 0.22 20% 35V  
 C7 1-131-404-00 s TANTALUM 0.22 20% 35V

C10 1-130-484-00 s FILM 0.012 5% 50V  
 C11 1-131-404-00 s TANTALUM 0.22 20% 35V  
 C13 1-131-404-00 s TANTALUM 0.22 20% 35V  
 C15 1-131-404-00 s TANTALUM 0.22 20% 35V  
 C17 1-130-483-00 s FILM 0.01 5% 50V

C21 1-131-404-00 s TANTALUM 0.22 20% 35V  
 C23 1-131-379-00 s TANTALUM 22 10% 10V  
 C27 1-124-313-00 s ELECT 100 20% 16V  
 C29 1-124-313-00 s ELECT 100 20% 16V  
 C32 1-163-227-00 s CERAMIC CHIP 10PF 5% 50V

C35 1-130-483-00 s FILM 0.01 5% 50V  
 C39 1-124-313-00 s ELECT 100 20% 16V  
 C104 1-131-350-00 s TANTALUM 3.3 10% 35V  
 C105 1-163-235-00 s CERAMIC CHIP 22PF 5% 50V  
 C106 1-163-235-00 s CERAMIC CHIP 22PF 5% 50V

C115 1-130-489-00 s FILM 0.033 5% 50V  
 C116 1-131-344-00 s TANTALUM 0.33 10% 35V  
 C118 1-123-566-00 s ELECT 2200 20% 16V  
 C121 1-131-347-00 s TANTALUM 1.0 10% 35V  
 C122 1-163-239-00 s CERAMIC CHIP 33PF 5% 50V

C130 1-131-381-00 s TANTALUM 47 10% 10V  
 C133 1-102-110-00 s CERAMIC 220PF 10% 50V  
 C301 1-124-233-00 s ELECT 10 20% 16V  
 C302 1-124-233-00 s ELECT 10 20% 16V  
 C303 1-124-233-00 s ELECT 10 20% 16V

C304 1-124-233-00 s ELECT 10 20% 16V  
 C305 1-124-233-00 s ELECT 10 20% 16V  
 C306 1-124-233-00 s ELECT 10 20% 16V

CN102 1-562-046-00 o 12P

CN104 1-562-046-00 o 12P

D1 8-719-101-23 s 1S2837  
 D2 8-719-100-05 s 1S2837  
 D3 8-719-100-03 s 1S2835  
 D4 8-719-100-03 s 1S2835  
 D5 8-719-100-03 s 1S2835

D6 8-719-100-05 s 1S2837  
 D7 8-719-100-05 s 1S2837  
 D101 8-719-100-05 s 1S2837  
 D102 8-719-100-05 s 1S2837  
 D103 8-719-100-03 s 1S2835

D106 8-719-200-02 s 10E-2  
 D107 8-719-200-02 s 10E-2  
 D108 8-719-100-03 s 1S2835  
 D109 8-719-100-03 s 1S2835  
 D110 7-719-100-03 s 1S2835



# SS-23 (DUS-40), SW-82, TC-33

Ref.No. Parts No. SP Description

D301 8-719-100-03 s 1S2835  
D302 8-719-100-03 s 1S2835  
D303 8-719-100-03 s 1S2835

IC1 8-751-941-03 s CX194B(SONY)  
IC2 8-749-911-55 s BX1155(SONY)  
IC3 8-759-729-03 s NJM2903D(JRC)  
IC4 8-759-345-38 s HD14538BP(HITACHI)  
IC101 8-757-850-00 s CX785(SONY)  
UC:S/N 10490 AND LOWER  
J :S/N 10255 AND LOWER  
8-755-641-90 s CX564(SONY)  
UC:S/N 40001 AND HIGHER  
J :S/N 10256 AND HIGHER

IC102 8-759-101-14 s uPD8243C(NEC)  
IC103 8-759-245-12 s TC4512BP(TOSHIBA)  
IC104 8-759-245-12 s TC4512BP(TOSHIBA)  
IC105 8-759-345-38 s HD14538BP(HITACHI)  
IC106 8-759-240-20 s TC4020BP(TOSHIBA)

IC107 8-759-240-69 s TC4069UBP(TOSHIBA)  
IC108 8-759-200-59 s TD62703P(TOSHIBA)  
IC109 8-759-200-59 s TD62703P(TOSHIBA)  
IC110 8-741-119-60 s BX1196(SONY)  
IC111 8-741-107-10 s BX1071(SONY)

IC112 1-464-241-00 s DC LEVEL SENSOR  
IC113 8-759-759-82 s ROM,MBM27C32  
UC:S/N 10490 AND LOWER  
J :S/N 10255 AND LOWER

J101 1-564-317-00 o PIN,BOARD TO BOARD 5P(3P)  
J102 1-564-318-00 o PIN,BOARD TO BOARD 10P

L1 1-408-654-00 s MICRO 1mH  
L2 1-408-298-00 s 2mH

PW101 1-464-226-00 s DC-DC CONVERTER

Q1 8-729-612-22 s 2SA1162  
Q2 8-729-100-66 s 2SC1623  
Q3 8-729-100-66 s 2SC1623  
Q4 8-729-100-66 s 2SC1623  
Q5 8-729-100-66 s 2SC1623

Q6 8-729-100-66 s 2SC1623  
Q7 8-729-100-66 s 2SC1623  
Q101 8-729-100-66 s 2SC1623  
Q102 8-729-100-66 s 2SC1623  
Q103 8-729-100-66 s 2SC1623

Q104 8-729-100-66 s 2SC1623  
Q105 8-729-100-66 s 2SC1623  
Q107 8-729-100-76 s 2SA812  
Q108 8-729-100-76 s 2SA812  
Q109 8-729-100-76 s 2SA812

Q110 8-729-100-76 s 2SA812  
Q111 8-729-100-66 s 2SC1623  
Q112 8-729-100-66 s 2SC1623  
Q113 8-729-100-66 s 2SC1623  
Q114 8-729-100-66 s 2SC1623

R37 1-214-591-00 s METAL 27K 1% 1/8W  
R38 1-214-590-00 s METAL 24K 1% 1/8W  
R193 1-210-832-00 s CARBON 6.8M 5% 1/4W  
R194 1-214-587-00 s METAL 18K 1% 1/8W  
R237 1-214-576-00 s METAL 6.2K 1% 1/8W  
R238 1-210-830-00 s CARBON 5.6M 5% 1/4W

Ref.No. Parts No. SP Description

RV1 1-228-461-00 s VAR,CERMET 50K  
RV3 1-228-463-00 s VAR,CERMET 200K  
RV4 1-228-461-00 s VAR,CERMET 50K  
RV5 1-228-460-00 s VAR,CERMET 20K  
RV6 1-228-459-00 s VAR,CERMET 10K

RV7 1-228-461-00 s VAR,CERMET 50K  
RV101 1-228-458-00 s VAR,CERMET 5K  
RV102 1-228-464-00 s VAR,CERMET 500K

X101 1-567-064-00 s 34.4KHz  
X102 1-567-068-00 s 3.58MHz

## SW-82 BOARD

1-608-037-00 o PRINTED CIRCUIT BOARD,SW-82

S1 1-553-577-00 s MICRO "UNTHREAD END"  
S2 1-553-650-11 s MICRO "UNTHREAD END"

## TC-33 BOARD

A-6717-369-B o MOUNTED CIRCUIT BOARD,TC-33

C2 1-131-347-00 s TANTALUM 1 10% 35V  
C4 1-163-235-00 s CERAMIC CHIP 22PF 5% 50V  
C5 1-131-365-00 s TANTALUM 10 10% 20V  
C7 1-163-243-00 s CERAMIC CHIP 47PF 5% 50V  
C8 1-163-243-00 s CERAMIC CHIP 47PF 5% 50V

C11 1-163-141-00 s CERAMIC CHIP 0.001 5% 50V  
C12 1-131-349-00 s TANTALUM 2.2 10% 35V  
C13 1-131-367-00 s TANTALUM 22 10% 20V  
C16 1-131-367-00 s TANTALUM 22 10% 20V  
C24 1-131-368-00 s TANTALUM 3.3 10% 16V

C25 1-131-349-00 s TANTALUM 2.2 10% 35V  
C26 1-131-349-00 s TANTALUM 2.2 10% 35V  
C27 1-131-344-00 s TANTALUM 0.33 10% 35V

D1 8-719-100-05 s 1S2837  
D2 8-719-100-05 s 1S2837  
D3 8-719-100-05 s 1S2837  
D4 8-719-902-27 s EBR3402S"RF"  
D5 8-719-902-27 s EBR3402S"SERVO"

D6 8-719-902-27 s EBR3402S"HUMID"  
D7 8-719-902-27 s EBR3402S"SLACK"  
D8 8-719-902-27 s EBR3402S"TAPE END"  
D9 8-719-902-27 s EBR3402S"BATTERY"  
D10 8-719-100-05 s 1S2837

D11 8-719-100-05 s 1S2837  
D12 8-719-100-05 s 1S2837  
D13 8-719-100-05 s 1S2837  
D14 8-719-100-05 s 1S2837  
D15 8-719-100-05 s 1S2837

D16 8-719-100-05 s 1S2837  
D17 8-719-100-05 s 1S2837  
D18 8-719-100-05 s 1S2837  
D19 8-719-100-05 s 1S2837

IC1 8-759-909-16 s CX-7907A(SONY)  
IC2 8-759-912-92 s CX-23051(SONY)  
IC3 8-759-200-99 s TC4051BF(TOSHIBA)  
IC4 8-759-906-53 s TL062CPS(TI)  
IC5 8-759-200-99 s TC4051BF(TOSHIBA)

# TC-33, TR-15 (DU-55, DUS-35), VA-16

Ref.No.	Parts No.	SP	Description
IC7	8-759-200-90	s	TC4538BF(TOSHIBA)
IC8	8-759-200-65	s	TC4013BF(TOSHIBA)
IC9	8-759-906-43	s	SM6430C(NPC)
IC10	8-759-340-46	s	HD14046BF(HITACHI)
IC11	8-759-200-79	s	TC4069BF(TOSHIBA)
IC12	8-759-200-84	s	TC4081BF(TOSHIBA)
IC13	8-759-200-83	s	TC4071BF(TOSHIBA)
IC14	8-759-200-78	s	TC4030BF(TOSHIBA)
IC15	8-759-178-05	s	uPC78L05(NEC)
IC16	8-759-201-05	s	TC4056BF(TOSHIBA)
IC17	8-759-201-05	s	TC4056BF(TOSHIBA)
IC18	8-759-201-05	s	TC4056BF(TOSHIBA)
IC19	8-759-201-05	s	TC4056BF(TOSHIBA)
IC20	8-759-201-05	s	TC4056BF(TOSHIBA)
IC21	8-759-201-05	s	TC4056BF(TOSHIBA)

LCD1	1-806-019-21	s	LIQUID CRYSTAL WITH LAMPS UC:S/N 40323 AND LOWER J :S/N 10475 AND LOWER
	1-807-338-11	s	DISPLAY PANEL,LIQUID CRYSTAL UC:S/N 40324 AND HIGHER J :S/N 10476 AND HIGHER
L1	1-518-566-11	s	LAMP,PILOT UC:S/N 40324 AND HIGHER J :S/N 10476 AND HIGHER
L2	1-518-566-11	s	LAMP,PILOT UC:S/N 40324 AND HIGHER J :S/N 10476 AND HIGHER
Q1	8-729-100-66	s	2SC1623
Q2	8-729-100-66	s	2SC1623
Q3	8-729-100-66	s	2SC1623
Q4	8-729-100-66	s	2SC1623
Q5	8-729-100-66	s	2SC1623
Q6	8-729-100-66	s	2SC1623
Q7	8-729-463-73	s	2SD637
Q8	8-729-100-66	s	2SC1623
Q9	8-729-216-22	s	2SA1162

R78	1-247-879-00	s	CARBON 100K 5% 1/6W
R79	1-247-879-00	s	CARBON 100K 5% 1/6W
R80	1-247-879-00	s	CARBON 100K 5% 1/6W
R81	1-247-879-00	s	CARBON 100K 5% 1/6W
R82	1-247-879-00	s	CARBON 100K 5% 1/6W
R83	1-247-879-00	s	CARBON 100K 5% 1/6W

S1	1-553-739-21	s	KEY"SEC"
S2	1-553-739-21	s	KEY"SEC"
S3	1-553-739-21	s	KEY"MIN"
S4	1-553-739-21	s	KEY"MIN"
S5	1-553-739-21	s	KEY"HOUR"

S6	1-553-739-21	s	KEY"HOUR"
S7	1-554-076-00	s	SLIDE"TC/UB"
S8	1-554-076-00	s	SLIDE"TC/TAPE TIME"
S9	1-553-739-21	s	KEY"RESET"
S10	1-554-076-00	s	SLIDE"FREE RUN/REC RUN"
S11	1-553-739-21	s	KEY"LIGHT"

X1	1-527-853-00	s	OSC. 7.159MHz
X2	1-567-069-11	s	OSC. 31.25KHz
X3	1-567-079-00	s	OSC. 31.4685KHz

## TR-15 BOARD

A-6715-169-E	o	MOUNTED CIRCUIT BOARD,TR-15 WITH DU-55 & DUS-35 BOARD
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Ref.No.	Parts No.	SP	Description
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## DU-55 BOARD

1-610-849-00	o	PRINTED CIRCUIT BOARD,DU-55
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C1	1-131-341-00	s	TANTALUM 0.1 10% 35V
C4	1-131-415-00	s	TANTALUM 0.68 20% 16V
C5	1-131-415-00	s	TANTALUM 0.68 20% 16V

CN311	1-508-696-00	o	4P
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IC1	8-759-200-90	s	TC4538BF(TOSHIBA)
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RV1	1-228-478-00	s	VAR,CERMET 200K
RV2	1-228-476-00	s	VAR,CERMET 50K

## TR-15 BOARD

C1	1-131-381-00	s	TANTALUM 47 10% 10V
C2	1-131-347-00	s	TANTALUM 1.0 10% 35V
C8	1-131-345-00	s	TANTALUM 0.47 10% 35V
C9	1-131-345-00	s	TANTALUM 0.47 10% 35V
C12	1-163-243-00	s	CERAMIC CHIP 47PF 5% 50V

C14	1-131-408-00	s	TANTALUM 1 20% 25V
C15	1-131-419-00	s	TANTALUM 2.2 20% 10V
C16	1-123-566-00	s	ELECT 2200 20% 16V

D1	8-719-101-23	s	1SS123
D2	8-719-101-23	s	1SS123
D3	8-719-101-23	s	1SS123
D4	8-719-200-02	s	10E-2
D5	8-719-160-63	s	RD15FB3

D6	8-719-200-02	s	10E-2
D7	8-719-130-07	s	RD3.0E

IC1	8-749-911-54	s	BX1154(SONY)
IC2	8-741-106-30	s	BX1063(SONY)
IC3	8-759-145-58	s	uPC4558C(NEC)
IC5	8-741-107-10	s	BX1071(SONY)
IC6	8-741-106-40	s	BX1064(SONY)

IC7	8-759-600-24	s	M54543L(MITSUBISHI)
IC8	8-759-143-05	s	uPC14305H(NEC)

L1	1-408-298-00	s	2mH
L2	1-459-155-00	s	45uH
L3	1-407-696-00	s	MICRO 18
L4	1-407-696-00	s	MICRO 18

Q1	8-729-100-66	s	2SC1623
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R1	1-214-178-00	s	METAL 82K 1% 1/4W
R2	1-214-180-00	s	METAL 100K 1% 1/4W
R108	1-247-795-00	s	CARBON 33 5% 1/6W

RV1	1-228-455-00	s	VAR,CERMET 500
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## DUS-35 BOARD

C4	1-163-235-00	s	CERAMIC CHIP 22P 5% 50V
C6	1-131-377-00	s	TANTALUM 10 10% 10V

CN312	1-506-577-11	s	5P
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D1	8-719-101-23	s	1SS123
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Q1	8-729-102-66	s	2SC1632
Q2	8-729-102-66	s	2SC1632

RV1	1-228-475-00	s	VAR,CERMET 20K
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## VA-16 BOARD

A-6759-115-A	o	MOUNTED CIRCUIT BOARD,VA-16 WITH AL-6,DU-18,DUS-103,PG-3, RA-8 & TG-5 BOARD
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1-560-906-00	o	HEADER,10P for PCB
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# VA-16 (AL-6, DU-18, PG-3, RA-8, TG-5, DUS-103)

Ref.No. Parts No. SP Description

## AL-6 BOARD

A-6711-458-B o MOUNTED CIRCUIT BOARD,AL-6

C456 1-163-141-00 s CERAMIC CHIP 0.001 5% 50V  
C457 1-163-141-00 s CERAMIC CHIP 0.001 5% 50V  
C458 1-163-141-00 s CERAMIC CHIP 0.001 5% 50V  
C460 1-163-141-00 s CERAMIC CHIP 0.001 5% 50V  
C461 1-163-141-00 s CERAMIC CHIP 0.001 5% 50V

C465 1-131-343-00 s TANTALUM 0.22 10% 35V  
C466 1-131-341-00 s TANTALUM 0.1 10% 35V  
C467 1-130-495-00 s FILM 0.1 5% 50V  
C468 1-131-354-00 s TANTALUM 1.5 10% 25V

D451 8-719-100-03 s 1S2835  
D452 8-719-100-05 s 1S2837  
D453 8-719-100-03 s 1S2835  
D454 8-719-100-03 s 1S2835

IC451 8-759-700-43 s NJM4558M(JRC)  
IC452 8-759-700-43 s NJM4558M(JRC)  
IC453 8-759-200-90 s TC4538BF(TOSHIBA)  
IC454 8-759-200-90 s TC4538BF(TOSHIBA)

Q451 8-729-271-22 s 2SC2712  
Q452 8-729-271-22 s 2SC2712  
Q453 8-729-216-22 s 2SA1162

RV451 1-228-310-00 s VAR,CERMET 50K

## DU-18 BOARD

1-608-823-00 o PRINTED CIRCUIT BOARD,DU-18

X1 1-567-060-00 s VCO,10.73MHz

## PG-3 BOARD

A-6728-797-A o MOUNTED CIRCUIT BOARD,PG-3

C2 1-163-255-00 s CERAMIC CHIP 150PF 5% 50V  
C3 1-163-255-00 s CERAMIC CHIP 150PF 5% 50V  
C4 1-163-255-00 s CERAMIC CHIP 150PF 5% 50V  
C5 1-163-255-00 s CERAMIC CHIP 150PF 5% 50V  
C6 1-163-239-00 s CERAMIC CHIP 33PF 5% 50V

IC1 8-759-220-02 s TC40H002P(TOSHIBA)  
IC2 8-759-902-21 s SN74LS221N(TI)  
IC3 8-759-902-21 s SN74LS221N(TI)

R1 1-214-579-00 s METAL 8.2K 1% 1/8W  
R3 1-214-557-00 s METAL 1K 1% 1/8W

RV1 1-228-458-00 s VAR,CERMET 5K  
RV2 1-228-458-00 s VAR,CERMET 5K  
RV3 1-228-459-00 s VAR,CERMET 10K

## RA-8 BOARD

A-6711-461-A o MOUNTED CIRCUIT BOARD,RA-8

D1 8-719-911-19 s 1SS119  
D2 8-719-911-19 s 1SS119

Q1 8-729-178-54 s 2SC2785  
Q2 8-729-178-54 s 2SC2785  
Q3 8-729-384-46 s 2SA844  
Q4 8-729-612-77 s 2SA1027R  
Q5 8-729-663-47 s 2SC1364  
Q6 8-729-178-54 s 2SC2785

R8 1-214-557-00 s METAL 1K 1% 1/8W  
R9 1-214-589-00 s METAL 22K 1% 1/8W  
R10 1-214-589-00 s METAL 22K 1% 1/8W  
R11 1-214-557-00 s METAL 1K 1% 1/8W

Ref.No. Parts No. SP Description

## TG-5 BOARD

A-6711-457-A o MOUNTED CIRCUIT BOARD,TG-5

C2 1-163-275-00 s CERAMIC CHIP 0.001 5% 50V  
C3 1-163-275-00 s CERAMIC CHIP 0.001 5% 50V  
C4 1-163-275-00 s CERAMIC CHIP 0.001 5% 50V  
C5 1-163-275-00 s CERAMIC CHIP 0.001 5% 50V

C2,C3 1-161-470-00 s CERAMIC CHIP 820P 5% 50V  
C4,C5 UC: S/N 10191 AND HIGHER  
J: S/N 10031 AND HIGHER

C6 1-163-141-00 s CERAMIC CHIP 0.001 5% 50V

D1 8-719-100-05 s 1S2837  
D2 8-719-100-05 s 1S2837

IC1 8-759-200-90 s TC4538BF(TOSHIBA)  
IC2 8-759-200-90 s TC4538BF(TOSHIBA)  
IC3 8-759-200-71 s TC4017BF(TOSHIBA)  
IC4 8-759-201-32 s TC40H390F(TOSHIBA)  
IC5 8-759-200-84 s TC4081BF(TOSHIBA)  
IC6 8-759-200-84 s TC4081BF(TOSHIBA)

Q1 8-729-271-22 s 2SC2712  
Q2 8-729-271-22 s 2SC2712  
Q3 8-729-271-22 s 2SC2712  
Q4 8-729-216-22 s 2SA1162  
Q5 8-729-271-22 s 2SC2712

## VA-16 BOARD

C1 1-107-159-00 s MICA 33PF 5% 500V  
C2 1-161-013-00 s CERAMIC 0.01 10% 25V  
C3 1-163-251-00 s CERAMIC CHIP 100PF 5% 50V  
C4 1-107-205-00 s MICA 13PF 5% 500V  
C5 1-107-081-00 s MICA 68PF 5% 50V

C7 1-107-079-00 s MICA 56PF 5% 50V  
C8 1-109-694-00 s DIPPED MICA 750PF 1% 500V  
C13 1-107-204-00 s MICA 12PF 5% 500V

DELETED  
UC:S/N 10381 AND HIGHER  
S/N 40001 AND HIGHER  
J :S/N 10196 AND HIGHER  
C14 1-107-204-00 s MICA 12PF 5% 500V  
DELETED  
UC:S/N 10381 AND HIGHER  
S/N 40001 AND HIGHER  
J :S/N 10196 AND HIGHER  
C15 1-107-085-00 s MICA 100PF 5% 50V

C16 1-163-267-00 s CERAMIC CHIP 470PF 5% 50V  
C17 1-131-347-00 s TANTALUM 1.0 10% 35V  
C20 1-107-078-00 s MICA 51PF 5% 50V  
C21 1-107-048-00 s MICA 6.8PF 500V  
C22 1-107-081-00 s MICA 68PF 5% 50V

C23 1-107-157-00 s MICA 27PF 5% 500V  
C101 1-131-375-00 s TANTALUM 4.7 10% 10V  
C102 1-131-375-00 s TANTALUM 4.7 10% 10V  
C105 1-131-375-00 s TANTALUM 4.7 10% 10V  
C106 1-131-375-00 s TANTALUM 4.7 10% 10V

C109 1-131-375-00 s TANTALUM 4.7 10% 10V  
C110 1-131-375-00 s TANTALUM 4.7 10% 10V  
C113 1-131-375-00 s TANTALUM 4.7 10% 10V  
C114 1-131-375-00 s TANTALUM 4.7 10% 10V  
C121 1-163-251-00 s CERAMIC CHIP 100PF 5% 50V

C123 1-163-247-00 s CERAMIC CHIP 68PF 5% 50V  
C124 1-107-093-00 s MICA 220PF 5% 50V  
C125 1-131-377-00 s TANTALUM 10 10% 10V  
C126 1-163-263-00 s CERAMIC CHIP 330PF 5% 50V  
C127 1-130-479-00 s FILM 0.0047 5% 50V

C128 1-131-370-00 s TANTALUM 6.8 10% 16V  
C129 1-131-370-00 s TANTALUM 6.8 10% 16V  
C130 1-109-682-00 s DIPPED MICA 240PF 1% 500V  
C131 1-107-210-00 s MICA 22PF 5% 500V  
C133 1-163-227-00 s CERAMIC CHIP 10PF 5% 50V

Ref.No. Parts No. SP Description

C136 1-163-243-00 s CERAMIC CHIP 47PF 5% 50V  
 C137 1-163-243-00 s CERAMIC CHIP 47PF 5% 50V  
 C138 1-163-243-00 s CERAMIC CHIP 47PF 5% 50V  
 C139 1-163-243-00 s CERAMIC CHIP 47PF 5% 50V  
 C140 1-131-377-00 s TANTALUM 10 10% 10V  
 C142 1-107-048-00 s MICA 6.8PF 500V  
 C145 1-131-377-00 s TANTALUM 10 10% 10V

C301 1-107-205-00 s MICA 13PF 5% 500V  
 C304 1-107-079-00 s MICA 56PF 5% 50V  
 C305 1-109-690-00 s DIPPED MICA 510PF 1% 500V  
 C307 1-131-377-00 s TANTALUM 10 10% 10V  
 C308 1-131-377-00 s TANTALUM 10 10% 10V

C309 1-131-377-00 s TANTALUM 10 10% 10V  
 C311 1-107-204-00 s MICA 12PF 5% 500V  
 C312 1-163-267-00 s CERAMIC CHIP 470PF 5% 50V  
 C313 1-107-085-00 s MICA 100PF 5% 50V  
 C314 1-131-347-00 s TANTALUM 1.0 10% 35V

C317 1-107-158-00 s MICA 30PF 5% 500V  
 C318 1-107-078-00 s MICA 51PF 5% 50V  
 C340 1-107-204-00 s MICA 12PF 5% 500V  
 C505 1-131-347-00 s TANTALUM 1.0 10% 35V  
 C508 1-131-347-00 s TANTALUM 1.0 10% 35V

C511 1-163-263-00 s CERAMIC CHIP 330PF 5% 50V  
 C512 1-109-154-00 s DIPPED MICA 240PF 5% 300V  
 C513 1-107-163-00 s MICA 47PF 5% 500V  
 C516 1-163-255-00 s CERAMIC CHIP 150PF 5% 50V  
 C518 1-163-255-00 s CERAMIC CHIP 150PF 5% 50V

C519 1-107-161-00 s MICA 39PF 5% 500V  
 C520 1-131-342-00 s TANTALUM 0.15 20% 35V  
 C605 1-131-347-00 s TANTALUM 1.0 10% 35V  
 C608 1-131-347-00 s TANTALUM 1.0 10% 35V  
 C611 1-163-263-00 s CERAMIC CHIP 330PF 5% 50V

C612 1-109-154-00 s DIPPED MICA 240PF 5% 300V  
 C613 1-107-163-00 s MICA 47PF 5% 500V  
 C616 1-163-255-00 s CERAMIC CHIP 150PF 5% 50V  
 C618 1-163-255-00 s CERAMIC CHIP 150PF 5% 50V  
 C619 1-107-161-00 s MICA 39PF 5% 500V

C620 1-131-342-00 s TANTALUM 0.15 20% 35V  
 C910 1-124-236-00 s ELECT 47 20% 16V  
 C921 1-124-236-00 s ELECT 47 20% 16V  
 C936 1-124-236-00 s ELECT 47 20% 16V  
 C951 1-131-369-00 s TANTALUM 4.7 10% 16V

C952 1-131-369-00 s TANTALUM 4.7 10% 16V  
 C953 1-131-369-00 s TANTALUM 4.7 10% 16V  
 C954 1-131-369-00 s TANTALUM 4.7 10% 16V  
 C955 1-131-369-00 s TANTALUM 4.7 10% 16V  
 C956 1-131-369-00 s TANTALUM 4.7 10% 16V

C957 1-131-369-00 s TANTALUM 4.7 10% 16V  
 C958 1-131-369-00 s TANTALUM 4.7 10% 16V

CP801 1-433-258-00 s OSCILLATOR BLOCK, BIAS

D1 8-719-104-10 s 1SS99  
 D101 8-719-101-23 s 1SS123  
 D104 8-719-101-23 s 1SS123  
 D106 8-719-911-19 s 1SS119  
 D107 8-719-911-19 s 1SS119

D302 8-719-100-03 s 1S2835  
 D701 8-719-101-23 s 1SS123  
 D801 8-719-101-23 s 1SS123  
 D802 8-719-101-23 s 1SS123  
 D901 8-719-815-55 s 1S1555

Ref.No. Parts No. SP Description

FB901 1-535-178-00 s  
 FB902 1-535-178-00 s  
 FB903 1-535-178-00 s  
 FB904 1-535-178-00 s  
 FB905 1-535-178-00 s

FB906 1-535-178-00 s  
 FB907 1-535-178-00 s  
 FB908 1-535-178-00 s  
 FB909 1-535-178-00 s  
 FB910 1-535-178-00 s

FB911 1-535-178-00 s  
 FB912 1-535-178-00 s  
 FB913 1-535-178-00 s  
 FB914 1-535-178-00 s  
 FB915 1-535-178-00 s  
 FB916 1-535-178-00 s

FL1 1-235-308-00 s LFF  
 FL2 1-235-308-00 s LFF  
 FL3 1-235-189-00 s LFF

IC1 8-741-106-90 s BX1069(SONY)  
 IC3 8-741-105-80 s BX1058(SONY)  
 IC4 8-759-200-60 s TA7060AP(TOSHIBA)  
 IC101 8-759-201-40 s TL8605P-S(TOSHIBA)  
 IC102 8-759-201-40 s TL8605P-S(TOSHIBA)

IC103 8-759-201-40 s TL8605P-S(TOSHIBA)  
 IC104 8-759-201-40 s TL8605P-S(TOSHIBA)  
 IC105 8-759-240-51 s TC4051BP(TOSHIBA)  
 IC106 8-759-906-27 s CX7970(SONY)  
 IC107 8-759-145-58 s uPC4558C(NEC)

IC108 8-759-902-21 s SN74LS221N(TI)  
 IC301 8-741-106-90 s BX1069(SONY)  
 IC303 8-741-105-80 s BX1058(SONY)  
 IC304 8-759-200-60 s TA7060AP(TOSHIBA)  
 IC501 8-741-134-32 s BX1343A(SONY)

IC502 8-741-115-20 s BX1152(SONY)  
 IC503 8-759-745-60 s NJM4560D(JRC)  
 IC601 8-741-134-32 s BX1343A(SONY)  
 IC602 8-741-115-20 s BX1152(SONY)  
 IC701 8-749-939-97 s BX3997(SONY)

IC702 8-759-240-53 s TC4053BP(TOSHIBA)  
 IC801 8-749-939-98 s BX3998(SONY)

LV501 1-459-434-00 s VAR, 22mH  
 LV502 1-459-411-00 s VAR, 18mH  
 LV503 1-459-411-00 s VAR, 18mH  
 LV601 1-459-434-00 s VAR, 22mH  
 LV602 1-459-411-00 s VAR, 18mH  
 LV603 1-459-411-00 s VAR, 18mH

Q2 8-729-271-22 s 2SC2712  
 Q3 8-724-375-01 s 2SC403C  
 Q5 8-729-603-50 s 2SC403SP  
 Q6 8-729-271-22 s 2SC2712  
 Q7 8-724-375-01 s 2SC403C

Q9 8-729-271-22 s 2SC2712  
 Q11 8-729-190-12 s 2SC2901  
 Q12 8-729-271-22 s 2SC2712  
 Q13 8-724-375-01 s 2SC403C  
 Q14 8-729-271-22 s 2SC2712

Q15 8-729-271-22 s 2SC2712  
 Q16 8-729-603-50 s 2SC403SP  
 Q101 8-729-271-22 s 2SC2712  
 Q102 8-729-271-22 s 2SC2712  
 Q103 8-729-271-22 s 2SC2712

Ref.No. Parts No. SP Description

Q104	8-729-271-22	s	2SC2712
Q105	8-729-112-06	s	2SA1206
Q106	8-769-193-09	s	2SK43-3
Q107	8-729-201-81	s	2SK270-GR
Q108	8-729-602-67	s	2SA1026-7
Q109	8-729-190-12	s	2SC2901
Q111	8-729-271-22	s	2SC2712
Q112	8-729-216-22	s	2SA1162
Q113	8-724-375-01	s	2SC403C
Q114	8-729-271-22	s	2SC2712
Q115	8-724-375-01	s	2SC403C
Q116	8-729-271-22	s	2SC2712
Q117	8-729-190-12	s	2SC2901
Q118	8-729-271-22	s	2SC2712
Q119	8-729-271-22	s	2SC2712
Q120	8-729-271-22	s	2SC2712
Q121	8-769-193-09	s	2SK43-3
Q122	8-729-112-06	s	2SA1206
Q123	8-729-216-22	s	2SA1162
Q124	8-729-216-22	s	2SA1162
Q125	8-729-216-22	s	2SA1162
Q126	8-729-216-22	s	2SA1162
Q301	8-724-375-01	s	2SC403C
Q302	8-729-271-22	s	2SC2712
Q303	8-729-190-12	s	2SC2901
Q304	8-724-375-01	s	2SC403C
Q305	8-729-271-22	s	2SC2712
Q306	8-729-603-50	s	2SC403SP
Q501	8-729-271-22	s	2SC2712
Q601	8-729-271-22	s	2SC2712
Q701	8-729-271-22	s	2SC2712
Q702	8-729-271-22	s	2SC2712
Q703	8-729-271-22	s	2SC2712
Q704	8-729-216-22	s	2SA1162
Q801	8-729-177-43	s	2SD774
R26	1-214-561-00	s	METAL 1.5K 1% 1/8W
R33	1-214-561-00	s	METAL 1.5K 1% 1/8W
R34	1-214-542-00	s	METAL 240 1% 1/8W
R151	1-214-576-00	s	METAL 6.2K 1% 1/8W
R152	1-214-557-00	s	METAL 1K 1% 1/8W
R302	1-214-561-00	s	METAL 1.5K 1% 1/8W
R309	1-214-559-00	s	METAL 1.2K 1% 1/8W
R310	1-214-545-00	s	METAL 330 1% 1/8W
R332	1-214-578-00	s	METAL 7.5K 1% 1/8W
R334	1-210-815-00	s	CARBON 1.2M 5% 1/4W
R402	1-214-509-00	s	METAL 10 1% 1/8W
R403	1-214-513-00	s	METAL 15 1% 1/8W
R404	1-214-674-00	s	METAL 5.1 1% 1/4W
R406	1-214-509-00	s	METAL 10 1% 1/8W
R407	1-214-513-00	s	METAL 15 1% 1/8W
R408	1-214-674-00	s	METAL 5.1 1% 1/4W
R415	1-214-509-00	s	METAL 10 1% 1/8W
R416	1-214-513-00	s	METAL 15 1% 1/8W
R417	1-214-674-00	s	METAL 5.1 1% 1/4W
R419	1-214-509-00	s	METAL 10 1% 1/8W
R420	1-214-513-00	s	METAL 15 1% 1/8W
R421	1-214-674-00	s	METAL 5.1 1% 1/4W
R503	1-247-791-00	s	CARBON 22 5% 1/6W
R504	1-247-791-00	s	CARBON 22 5% 1/6W
R515	1-247-791-00	s	CARBON 22 5% 1/6W

Ref.No. Parts No. SP Description

R516	1-247-791-00	s	CARBON 22 5% 1/6W
R603	1-247-791-00	s	CARBON 22 5% 1/6W
R604	1-247-791-00	s	CARBON 22 5% 1/6W
R701	1-247-807-00	s	CARBON 100 5% 1/6W
R702	1-247-807-00	s	CARBON 100 5% 1/6W
RV1	1-228-457-00	s	VAR,CERMET 2K
RV2	1-228-455-00	s	VAR,CERMET 500
RV3	1-228-458-00	s	VAR,CERMET 5K
RV4	1-228-456-00	s	VAR,CERMET 1K
RV5	1-228-456-00	s	VAR,CERMET 1K
RV6	1-228-457-00	s	VAR,CERMET 2K
RV12	1-228-454-00	s	VAR,CERMET 200
RV101	1-228-456-00	s	VAR,CERMET 1K
RV102	1-228-456-00	s	VAR,CERMET 1K
RV103	1-228-456-00	s	VAR,CERMET 1K
RV104	1-228-456-00	s	VAR,CERMET 1K
RV105	1-228-459-00	s	VAR,CERMET 10K
RV106	1-228-459-00	s	VAR,CERMET 10K
RV107	1-228-459-00	s	VAR,CERMET 10K
RV108	1-228-459-00	s	VAR,CERMET 10K
RV109	1-228-457-00	s	VAR,CERMET 2K
RV110	1-228-456-00	s	VAR,CERMET 1K
RV111	1-228-458-00	s	VAR,CERMET 5K
RV112	1-228-457-00	s	VAR,CERMET 2K
RV113	1-228-458-00	s	VAR,CERMET 5K
RV301	1-228-457-00	s	VAR,CERMET 2K
RV302	1-228-456-00	s	VAR,CERMET 1K
RV303	1-228-458-00	s	VAR,CERMET 5K
RV304	1-228-454-00	s	VAR,CERMET 200
RV401	1-228-457-00	s	VAR,CERMET 2K
RV402	1-228-454-00	s	VAR,CERMET 200
RV403	1-228-457-00	s	VAR,CERMET 2K
RV404	1-228-454-00	s	VAR,CERMET 200
RV405	1-228-457-00	s	VAR,CERMET 2K
RV406	1-228-454-00	s	VAR,CERMET 200
RV407	1-228-457-00	s	VAR,CERMET 2K
RV408	1-228-454-00	s	VAR,CERMET 200
RV409	1-228-453-00	s	VAR,CERMET 100
RV410	1-228-453-00	s	VAR,CERMET 100
RV411	1-228-453-00	s	VAR,CERMET 100
RV412	1-228-453-00	s	VAR,CERMET 100
RV451	1-228-459-00	s	VAR,CERMET 10K
RV501	1-228-459-00	s	VAR,CERMET 10K
RV502	1-228-458-00	s	VAR,CERMET 5K
RV503	1-228-464-00	s	VAR,CERMET 500K
RV601	1-228-459-00	s	VAR,CERMET 10K
RV602	1-228-458-00	s	VAR,CERMET 5K
RV603	1-228-464-00	s	VAR,CERMET 500K
RV701	1-228-457-00	s	VAR,CERMET 2K
RV702	1-228-459-00	s	VAR,CERMET 10K
RV703	1-224-255-XX	s	VAR,METAL 100K
RV801	1-228-458-00	s	VAR,CERMET 5K
S1	1-554-076-00	s	SLIDE"NR ON/OFF"
TM801	1-548-119-00	s	HOURS METER
DUS-103 BOARD			
US:S/N 40771 AND HIGHER			
J :S/N 10596 AND HIGHER			
C201	1-107-046-00	s	MICA 4.7PF 0.5PF 500V
D201	8-719-100-03	s	1S2835
RV201	1-228-457-00	s	VAR,CERMET 2K
Q201	8-729-175-73	s	2SC2757
Q202	8-729-122-63	s	2SA1226

Ref.No. Parts No. SP Description

## FRAME

	1-608-028-00	o	PRINTED CIRCUIT BOARD, FL-7
	1-586-633-00	s	CONDENSATION SENSOR
C30	1-161-021-00	s	CERAMIC 0.047
CN12	1-562-080-00	o	HOUSING, 2P
	1-560-006-00	o	CONTACT
	1-562-081-00	o	PLUG, 2P
	1-560-406-00	o	CONTACT
CN901	1-509-184-31	s	RECEPTACLE, XLR 3P FEMALE "AUDIO IN CH-1"
CN902	1-509-184-31	s	RECEPTACLE, XLR 3P FEMALE "AUDIO IN CH-2"
CN903	1-560-999-11	s	RECEPTACLE, XLR 4P MALE WITH SWITCH "DC IN 12V"
CN904	1-562-086-00	s	RECEPTACLE, 5P "EXT BATTERY IN"
CN905	1-562-083-00	s	RECEPTACLE, 50P "CAMERA"
	1-562-084-11	s	CONTACT
	1-562-084-21	s	CONTACT
D901	8-719-103-15	s	LED, SE304-2K
D902	8-719-103-15	s	LED, SE304-2K
H901	8-825-554-12	s	RPS243-2103A "AUDIO/TC/CONFIDENCE"
H902	8-825-554-32	s	EPS244-21 "CTL/FULL ERASE"
L901	1-464-267-00	s	"TAPE END SENSOR"
M901	8-835-079-01	s	DC, DNR-5900A "THREADING"
M902	8-838-036-01	s	DC, BHF-1904A "CAPSTAN"
M903	A-6737-112-C	s	MOTOR ASS'Y "DRUM"
C1	1-102-363-00	s	FEED-THROUGH 0.001 50V
C2	1-102-363-00	s	FEED-THROUGH 0.001 50V
PM901	1-454-335-00	s	"BRAKE"
PM902	1-454-335-00	s	"EJECT"
PM903	1-454-334-00	s	"FWD"
PM904	1-454-340-00	s	"PINCH"
Q901	8-729-101-14	s	PHOTO-Tr, PH103-2L
Q902	8-729-101-14	s	PHOTO-Tr, PH103-2L
S901	1-553-650-11	s	MICRO "CASSETTE IN"
S902	1-553-915-31	s	MICRO "CASSETTE LOCK"
S903	1-553-915-41	s	MICRO "EJECT"
S904	1-554-251-00	s	REED "THREAD END"
S905	1-553-915-41	s	MICRO "REW"
S906	1-553-448-00	s	LEVER ROCKER "POWER"

## 16-4. PACKING MATERIAL AND ACCESSORY (SUPPLIED)

Parts No.	SP	Description
1-557-660-11	s	CABLE, TIME CODE
1-562-641-11	s	CONNECTOR(P-F)
1-564-688-11	s	CONNECTOR(P-M)
1-562-642-11	s	CONNECTOR(R-F)
3-676-089-03	s	SCREW, LID
3-676-269-00	s	CAP(50P SOCKET SIDE), DUST
3-676-372-00	s	STRAP, BATTERY LID
3-678-763-00	o	SPACER
3-678-766-00	o	CUSHION, UPPER
3-678-767-00	o	CUSHION, LOWER
3-685-111-01	s	STRAP(N), SHOULDER
3-687-107-00	o	INDIVIDUAL CARTON
3-701-617-00	s	BAG, POLY(FOR BATTERY STRAP AND SCREWS)
3-701-630-00	s	BAG, POLY(FOR MANUAL)
3-701-637-00	s	BAG, POLY(FOR BVV-1A)

## 16-5. FIXTURE (OPTIONAL)

Parts No.	SP	Description
2-034-697-00	s	CLEANING PIECE
3-702-390-01	s	ECCENTRICITY DRIVER (4mm dia)
7-732-050-10	s	TENSION SCALE (20g full scale)
7-732-050-20	s	TENSION SCALE (50g full scale)
7-732-050-30	s	TENSION SCALE (100g full scale)
7-732-050-40	s	TENSION SCALE (200g full scale)
7-732-050-50	s	TENSION SCALE (500g full scale)
7-732-902-00	s	INSPECTION MIRROR
8-960-097-02	s	ALIGNMENT TAPE, CR2-1
8-960-097-03	s	ALIGNMENT TAPE, CR2-3
8-960-097-37	s	ALIGNMENT TAPE, CR5-1A
9-911-053-00	s	THICKNESS GAUGE
J-6001-820-A	s	DRUM ECCENTRICITY GAUGE (3)
J-6001-830-A	s	DRUM ECCENTRICITY GAUGE (2)
J-6001-840-A	s	DRUM ECCENTRICITY GAUGE (1)
J-6080-008-A	s	CASSETTE REFERENCE PLATE
J-6080-011-A	s	REEL TABLE TENSION GAUGE
J-6080-013-A	s	DIHEDRAL ADJUSTMENT SCREW
J-6086-570-A	s	FLATNESS PLATE
J-6087-000-A	s	DRUM ECCENTRICITY GAUGE (5)
J-6190-800-A	s	TENSION REGULATOR SLANTNESS CHECK TOOL
J-6195-360-A	s	BVV-1A PB ALIGNMENT CHECKER
Y-2031-001-0	s	CLEANING FLUID